

ORDER NO. KMS0301664C1

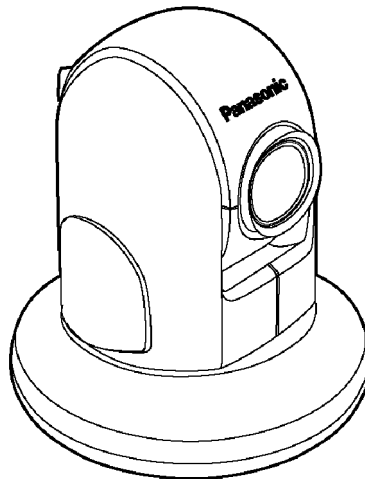
F5

Service Manual

Network Camera

KX-HCM280

(for U.S.A.)



⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all of the 11 digits. The serial number may be found on the bottom of the unit.

Panasonic

1. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When replacing, the following precautions will help to prevent recurring malfunctions.

1. Cover the plastic parts with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the work-table.
4. Do not grasp IC or LSI pins with bare fingers.

2. CAUTION

2.1. SAFETY PRECAUTIONS

1. Before servicing, unplug the power cord to prevent an electrical shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, make the following insulation resistance test to prevent a shock hazard.

2.2. BATTERY CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution:

Disposal or transportation of lithium batteries should be performed by permitted, in accordance with federal, state and local guidelines.

A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.

Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.

When the lithium battery is exchanged, the clock settings are cleared. In this case, make clock settings again.

Recommend Type Number:

BR12251VC (BAT1) Manufactured by MATSUSHITA

2.3. TRADEMARKS

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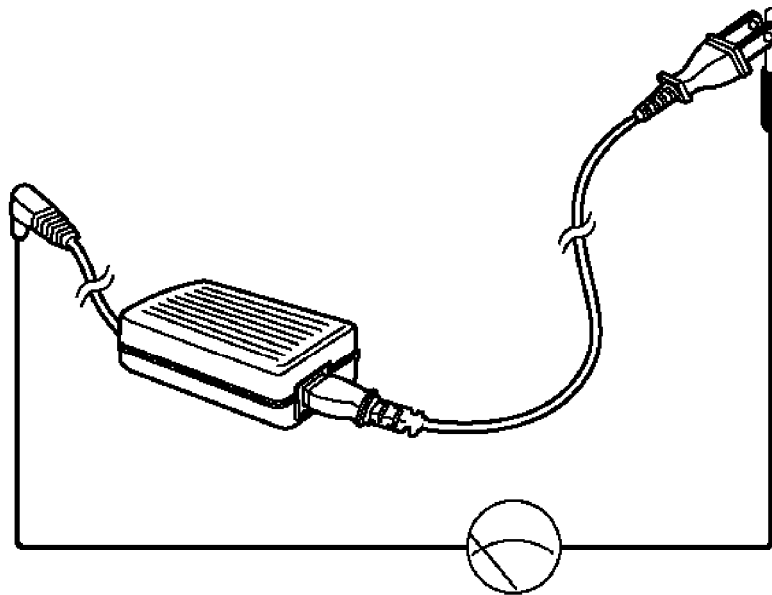
2.4. INSULATION RESISTANCE TEST

1. Unplug the AC power cord and short the two prongs of the plug with a jumper wire.
2. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw threads, etc.

Note:

Some exposed parts may be isolated from the chassis by design. These will read infinity.

3. If the measurement is outside the specified limits, there is a possibility of shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.



Ohm meter

Resistance = more than $1\text{M}\Omega$ (at DC 500 V)

2.5. POWER CAUTION

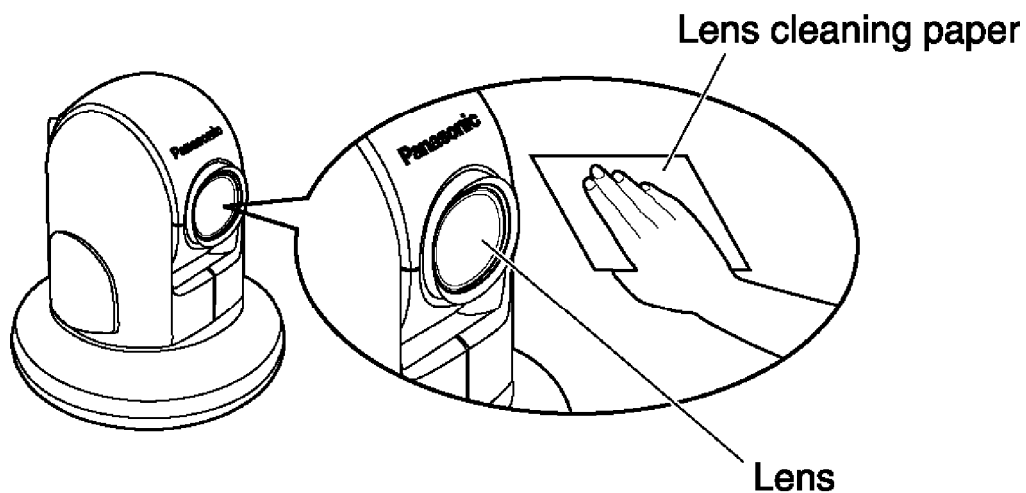
The power socket wall outlet should be located near this equipment and be easily accessible.

2.6. MAINTENANCE

To keep the Network Camera in the good condition, maintenance plays an important part. Please perform the recommended maintenance on a regular basis (as needed). After cleaning the dust from the lens with an air blower, please wipe the lens with a lens cleaning paper. Turning off the power is recommended when cleaning.

Lens

- When the power is on, do not manually revolve the Pan/Tilt.
Accidentally revolving or turning the pan / tilt mechanism while the camera is powered on may cause the memorized camera positions to change. If this occurs, please restart the camera by momentarily disconnecting power.
- Do not touch the lens. It can take away the protective coating on the lens. Fingerprints, dust, stains, etc. on the lens can also degrade the performance of the Automatic Focusing feature.
- Clean the lens with a lens cleaning paper.



3. SPECIFICATIONS

Network Camera Specifications

Item	Description
Pan/Tilt Angle	Pan: -175° to +175°, Tilt: -120° to 0° (On the table) / 0° to +90° (On the ceiling)
Sensor Type	1/4 type CCD (Interlace type)
Number of Pixels	380,000 pixels (Effective Pixels)
Illumination	3-100,000 lx
White Balance	Auto/Manual/Hold
Focus	Auto/Manual
Focal Distance	5 mm (0.2 inches) -Infinity
Zoom	21 x Optical Zoom
Minimum Object Distance	Wide: 5 mm (0.2 inches) Tele: 1 m (40 inches)
Caliber Ratio (F No.)	F1.6-3.6
Horizontal Viewing Angle	Tele: 2.6°, Wide: 51°
Exposure	Auto

Other Specifications

Item	Description
Video Compression	JPEG/3 Levels
Video Resolution	640 x 480, 320 x 240 (default), 160 x 120
Buffered Image *1	About 560 frames (320 x 240) with time display
Magnification	100% or 150%
Frame rate *2 *5	Max. 10 frames/second (640 x 480 *4) Max. 30 frames/second (320 x 240) Max. 30 frames/second (160 x 120)
Supported Protocols	TCP, UDP, IP, HTTP, FTP, SMTP, POP3, DHCP, DNS, DDNS, ARP, ICMP, N
Message Transferring Condition	When detecting the alarm
Message Transferring Method	SMTP
Image Transferring Condition	Timer: Day of the Week/Hour/Minute/Second Alarm: External Sensor Input
Image Transferring Method	SMTP, FTP
Interface	10 Base-T/100 Base-TX Ethernet RJ-45 connector x 1
External I/O *3	External Sensor Input x 1 External Device Control Output x 1
Indicator Display	Power/Network Communication/Network Camera operation/Ethernet link
Video Output	Analog Composite
Dimension (HWD)	140 mm (5.51 inches) x 123 mm (4.84 inches) x 123 mm (4.84 inches)
Weight	645 g (1.42 lb) (Only the unit)
Power Supply	AC adaptor: Input 120 V AC Output 12 V DC Consumption: 12 W
Condition	Operation temperature: 0°C to +40°C (+32°F to +104°F) Storage temperature: 0°C to +50°C (+32°F to +122°F) Humidity: 20% to 80% (No Condensation)
Setting Angle	Available between $\pm 15^\circ$ based on level line for mounting both on the table and on the ceiling.

*1) The maximum number of frames changes with the image quality and the object situation in Buffered Image.

*2) Frame rate varies with the network condition, the PC performance, the image quality and the object situation.

*3) A sensor must be attached to the Network Camera in order to perform the alarm trigger.

*4) Scan lines may deviate when viewing moving objects with resolution at 640 x 480 because of the interlace-type CCD. Selecting 320 x 240 offers the good compromise between speed and resolution.

*5) The normal 320 x 240 image requires the bandwidth of 2.4 Mbps.

Note:

Optimum viewed image quality is achieved by having PC's video display property to 24 / 32 bit.

4. MAIN FEATURES

EASY INSTALLATION

Setup CD-ROM simplifies the installation. Insert the Setup CD-ROM and auto run program should start the application automatically. This program automatically finds the Network Camera on the network.

HIGH SPEED MOTION JPEG

Network Camera employs a 380,000 pixel CCD image sensor, and has an integrated web server. Motion JPEG displays up to 30 frames per second, if the network provides enough bandwidth. To conserve bandwidth, JPEG - Regularly Refresh can be selected from the Top Page. Image Resolution, Image Quality, Refresh interval, Limit time of Continuous Motion JPEG and On the Air time features can control the image field.

REMOTE PAN/TILT/ZOOM/FOCUS

The following features allow you to operate Network Camera from web browser on your PC. High speed Pan/Tilt operation can move the lens horizontally from -175° to +175° and vertically from -120° to 0° in mounting on the table and from 0° to +90° in mounting on the ceiling. This movable lens allows you to view a wide range of perspective from a distant place. Network Camera has 21x Zooming and Automatic and Manual Focusing features to provide you with detailed and distinct images. It also has Preset Positioning and Home Positioning features to register fixed positions. Clicking the preset buttons moves the lens to registered preset positions. Single Camera screen has Click to Center feature too. The object on Single Camera screen can be centered by clicking on the image directly. Movement distances stated are maximum (default) values. Settings can be changed to suit each application.

MULTI-CAMERA SCREEN

Using Multi-Camera screen you can simultaneously view up to four Network Cameras at various locations. Clicking on each Camera Name switches to the Single Camera screen from the Multi-Camera screen.

MULTI CLIENT ACCESS

The Network Camera allows up to 30 users to view Motion JPEG image simultaneously. The users can access the Top View Image screen (Single Camera/Multi-Camera screen) from their own locations. Please note that as the number of users simultaneously connected to the Network Camera increases, the overall motion performance will decrease.

VIDEO OUTPUT

Network Camera has an analog composite output terminal. You can view images from Network Camera on TV and record them on videotapes.

EXTERNAL I/O (INPUT/OUTPUT)

The external sensors/devices such as a door sensor can connect to External Sensor Input. The external sensors/devices are customer provided. The alarm/ timer trigger can activate the Image Transfer feature, which can send the images via e-mail or FTP (File Transfer Protocol). External Device Control Output can send a signal to activate the external devices such as a light around the Network Camera.

UPDATE FIRMWARE

If Update Firmware is released, you can download the latest program from the Network Camera Technical Support Site. Installation is easy and fast.

AUTHENTICATION

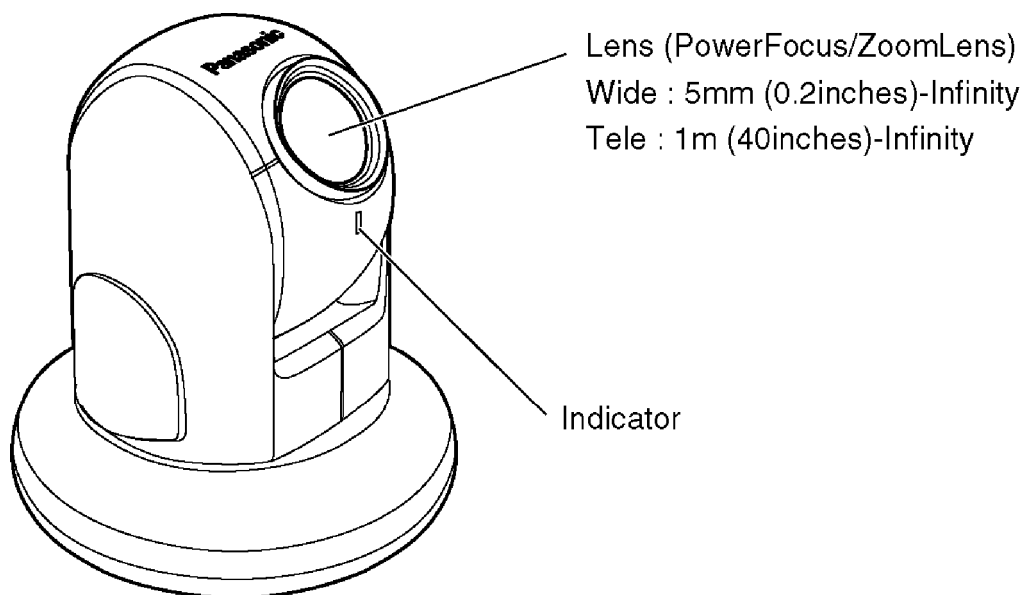
Authentication window requires you to enter the administrator/general user ID and password. Password security can prevent the unregistered users/intruders from accessing your image from their web browsers.

MULTI-LANGUAGE DISPLAY

Top Page, Single Camera screen and Multi-Camera screen can be displayed in English (US), English (UK), French, German, Italian, Spanish and Japanese. All the Setup windows are also changed in selecting English (US), English (UK) and Japanese.

5. PARTS LOCATIONS

5.1. FRONT VIEW



Indicator

Indicator can be controlled on Indicator Control window on Operating Instructions. Color indications are shown below.

Power on	Not on the LAN	Orange → Orange blinking *1 → Orange
	On the LAN	Orange → Green blinking → Green
Normal Operation		Green
Using DHCP	Getting IP address	Green blinking
	Finish getting IP address	Green
Updating Firmware		Orange blinking
Pushing CLEAR SETTING button		Orange blinking twice
Internal Failure of Network Camera		Red blinking

*1) Orange indicator will continue blinking in the DHCP setting.

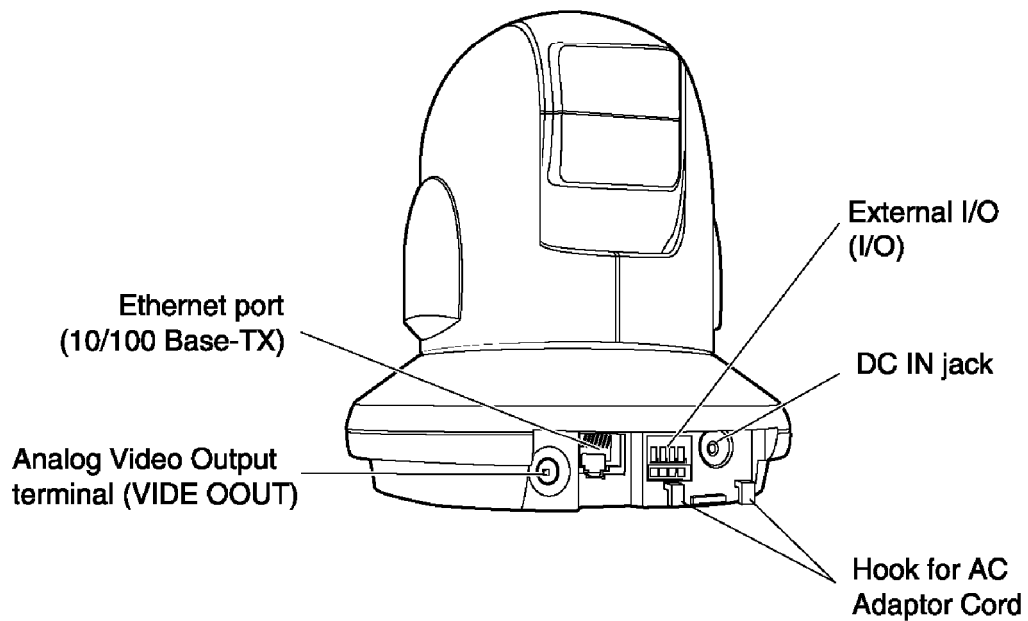
Lens and Pan/Tilt operation

Operation bar on the Single Camera screen can operate the Pan/Tilt. The Pan/Tilt moves the lens horizontally from -175° to +175° and vertically from -120° to 0° in mounting on the table and from 0° to +90° in mounting on the ceiling.

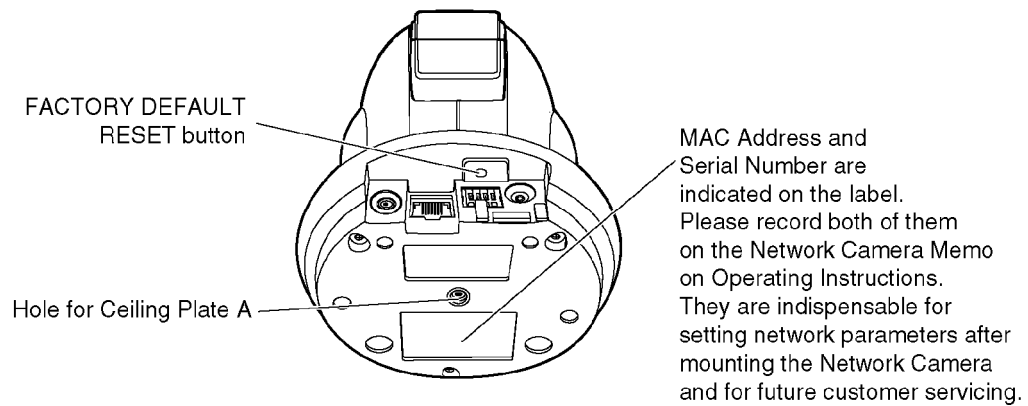
Note:

- **When the power is on, do not manually revolve the Pan/Tilt.**
Accidentally revolving or turning the pan / tilt mechanism while the camera is powered on may cause the memorized camera positions to change. If this occurs, please restart the camera by momentarily disconnecting power.
- **Do not touch the lens. It can take away the protective coating on the lens. Fingerprints, dust, stains, etc. on the lens can also degrade the performance of the Automatic Focusing feature.**

5.2. REAR VIEW



5.3. BOTTOM VIEW



6. CONNECTING YOUR NETWORK CAMERA

6.1. PREPARATION

Prepare the following before connecting the Network Camera.

- PC to fulfill the system requirements.

SYSTEM REQUIREMENTS

The PC (Personal Computer) and the network must meet the following technical specifications for the Network Camera to work properly.

Item	Description
Operation System	Microsoft® Windows® 95 operating system Microsoft® Windows® 98/SE operating system Microsoft® Windows® 2000 operating system Microsoft® Windows® Me operating system Microsoft® Windows NT® 4.0 operating system Microsoft® Windows® XP operating system
Network Protocol	TCP/IP network protocol installed. (HTTP, TCP, UDP, IP, DNS, ARP, ICMP)
Interface	10/100Mbps Ethernet® card for your network connection
Web Browser *1	Internet Explorer 5.0 or later/Netscape Navigator® 4.7 (Not included on the Setup CD-ROM).

*1 The Network Camera image is not displayed correctly in the Netscape® v6.x. Use Netscape Navigator v4.7.

Please refer to Panasonic Network Camera Site

<http://www.panasonic.com/netcam> for the latest information of the web browser.

Note:

Pentium® II 300 MHz or greater CPU is recommended to prevent performance degradation.

- Ethernet switching Hub or wireless Router for LAN Connection.
- Ethernet cable (two pieces of Category 5 straight cable, or a piece of Category 5 cross cable).
- Setup CD-ROM
The setup program simplifies Network Camera installation. Adobe® Acrobat® Reader 4.05 or later enables you to see the Operating Instructions on the Setup CD-ROM. If Adobe Acrobat Reader is not installed on the PC, double-click "ar405eng.exe". Refer to "ReadmeEng.txt" for the directory and file structure of the Setup CD-ROM.

Note:

- Do not scratch, smudge, write or label either surfaces of the Setup CD-ROM. Setup CD-ROM may have a scratch on the surface.
- Do not leave the Setup CD-ROM in direct sunlight, near a heat source or in a hot automobile as the Setup CD-ROM may become unreadable.
- Do not use chemicals or cleanser to clean the Setup CD-ROM as the Setup CD-ROM may become unreadable.

The display color quality

To insure the images you are viewing are the best they can be, set the Display property setting (color quality) to 24 bit or higher. Follow the next steps.

1. Close all applications so that you are looking at the Windows desktop.
2. Right-click an open portion of the desktop.
3. Select [Properties], [Setting] tab, and set [Color Quality] (Colors/ Color Pallet) to the highest selection possible.

Note:

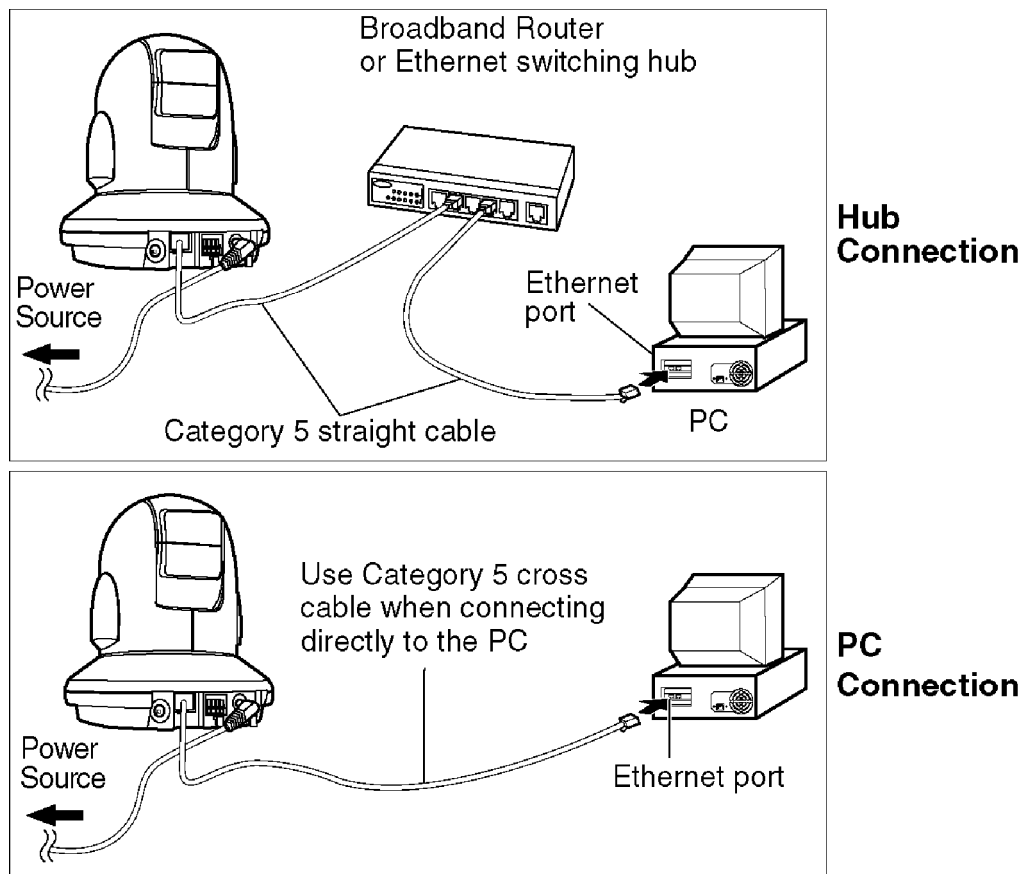
Optimum video viewing will be seen when the color quality is set to 24bit or higher. This change should not cause any problems with other applications on your PC.

6.2. CONNECTING THE NETWORK CAMERA

When checking the operation of the network camera, set up a configuration to be either of the two connecting patterns described below. For a configuration to be set up when connecting to the Internet, refer to the Operating Instructions.

Use Category 5 cross cable when connecting directly to the PC.

6.2.1. Wired Connection



6.3. NETWORK CAMERA SETTING

To access the network camera from a PC under the 6.2. **CONNECTING THE NETWORK CAMERA**, it is required to make the network settings of the PC consistent with those of the network camera. Using the setup CD-ROM, search the information from the PC about the network settings of the network camera. Make the settings (IP address and subnet mask) of the network camera consistent with those of the PC.

- Do not select establish the DHCP and DDNS about settings of the network camera and PC.

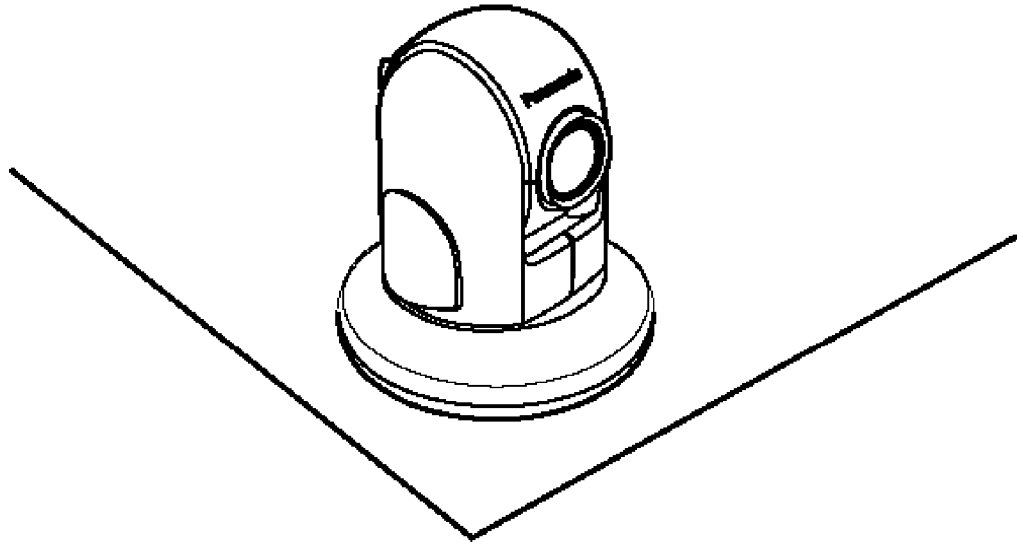
For more detailed information, refer to the Operating Instructions.

7. MOUNTING

Two ways of mounting are shown in the following figures. MAC Address and Serial Number are indicated on the bottom label of the main unit of the Network Camera. Please record both of them on the Network Camera Memo on Operating Instruction. They are indispensable for setting network parameters after mounting the Network Camera and for future customer servicing.

7.1. MOUNTING ON THE TABLE

Mount the Network Camera at an even place where vibrations etc. are few.



Note:

If this camera is installed in a commercial or industrial building, local building code may require specific installation methods to be used. In such cases we strongly suggest that you contact your local building inspector so that the installation complies with any applicable building code.

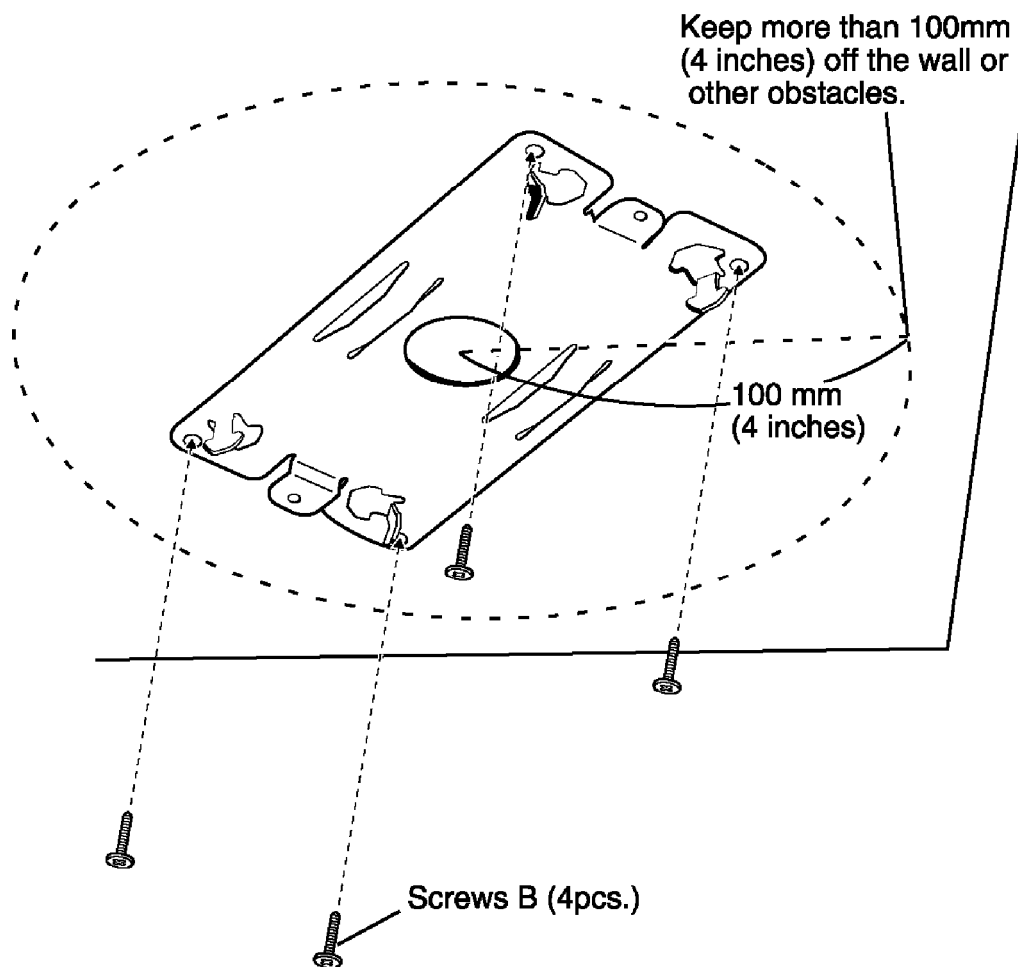
7.2. MOUNTING ON THE CEILING

Please set the Tilt range to [On the ceiling] on Camera Setup window on Operating Instruction. Two ways of wiring can be considered; wiring through a hole made in the ceiling or wiring without making a hole for a cable in the ceiling. Please select either one of the two.

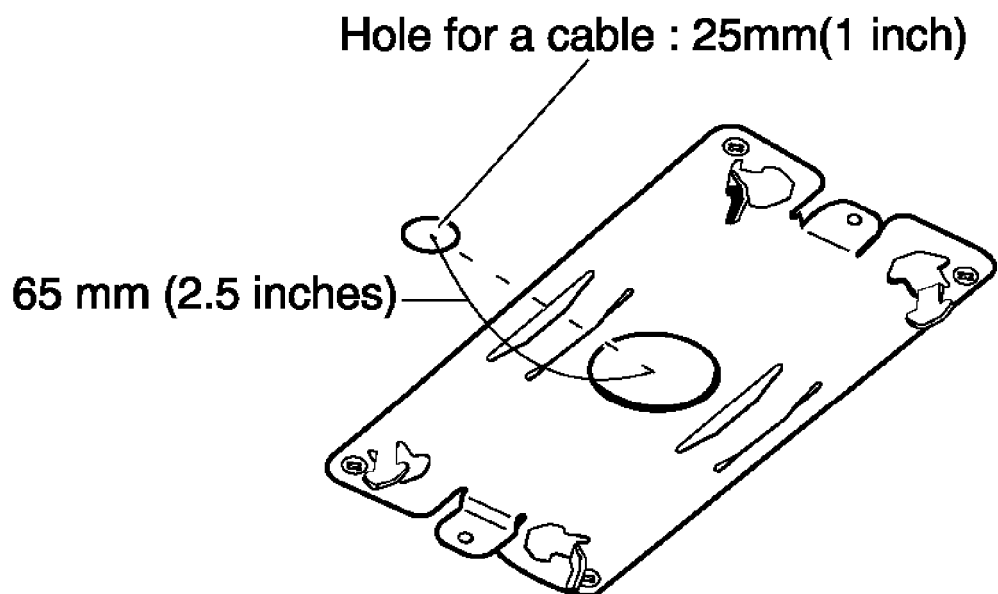
Wiring through a hole made in the ceiling

1. Fix the Ceiling Plate B on the ceiling with Screws B.

- **Fix the Ceiling Plate B more than 100 mm (4 inches) off the wall or other obstacles from its center.**
- **Make sure the Network Camera is firmly mounted on a beam of wood etc. When there is no beam, apply a board on the other side of the ceiling to make sure the Network Camera does not drop.**

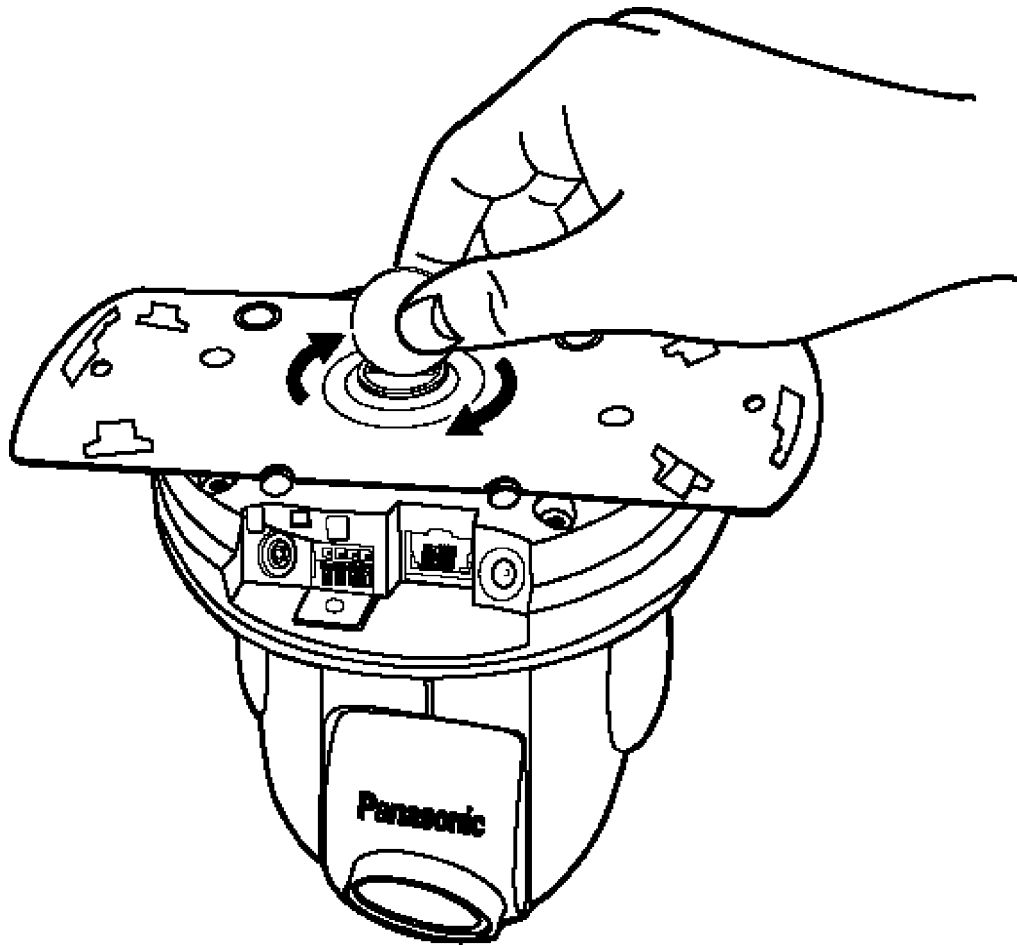


2. Make a hole for a cable.

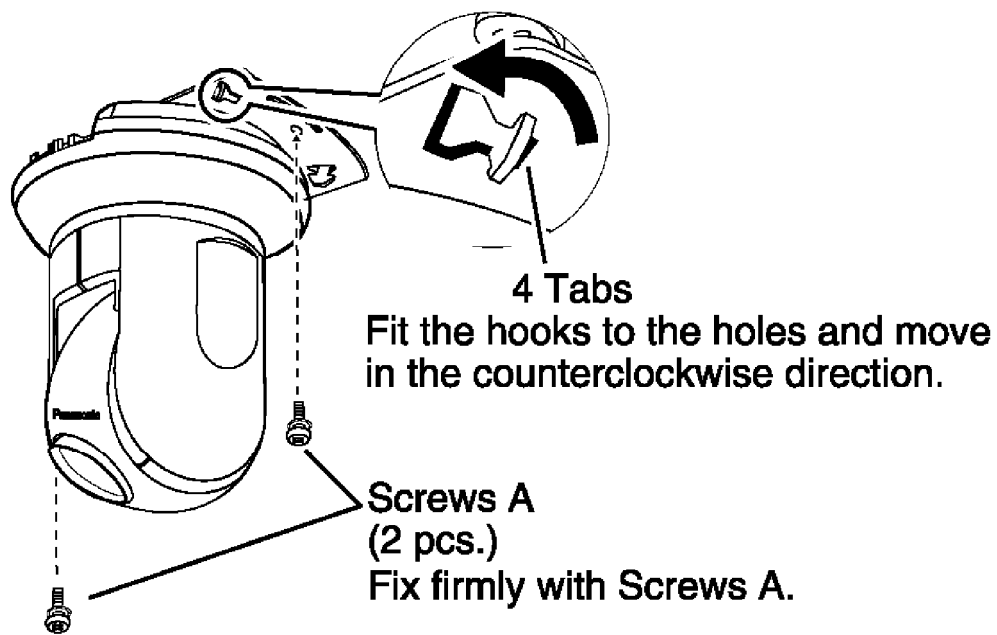


3. Fix firmly the Ceiling Plate A on the bottom of Network Camera.

- Make sure the Network Camera, using coins etc., is firmly fixed.

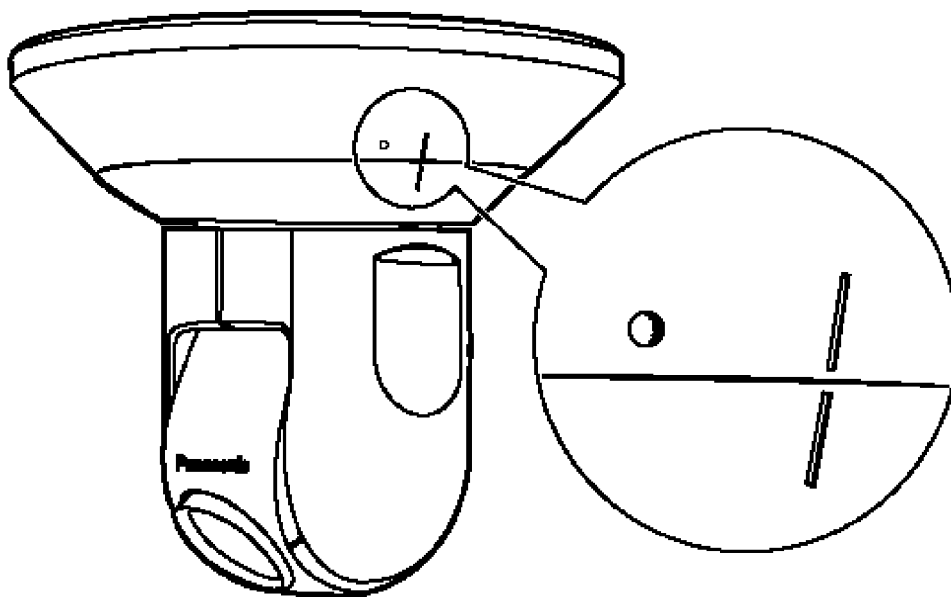


4. Fix the Ceiling Plate A to the Ceiling Plate B and fix them firmly with Screws A.



5. Connect the cable and fix the Ceiling Mounting Cover. Adjust the "I" of the Ceiling Mounting Cover to the "I" of the main unit.

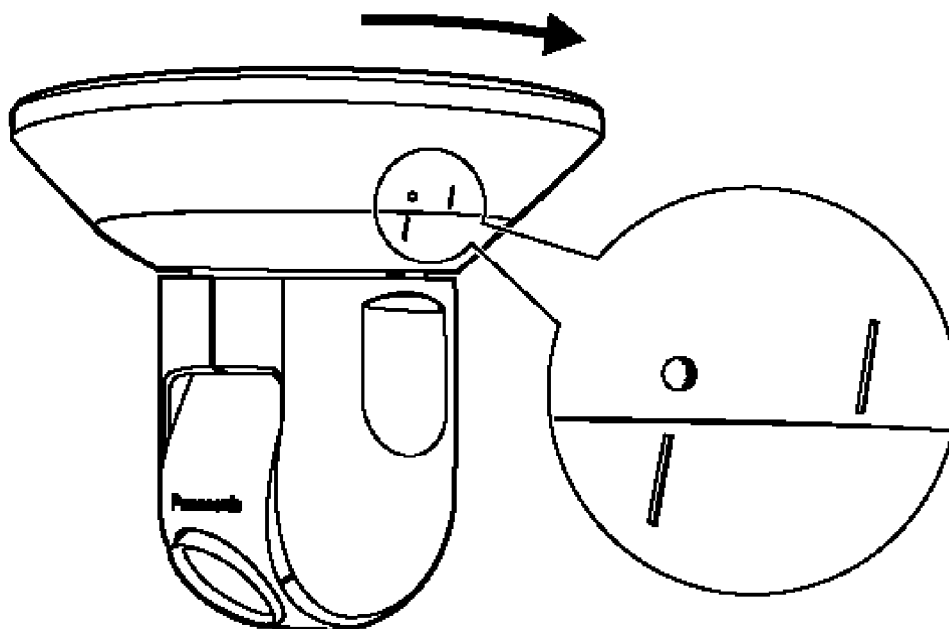
- Be careful not to nip the cable etc.



6. Move the Ceiling Mounting Cover in the clockwise direction until the "I" of it fits to the "I" of the main unit.

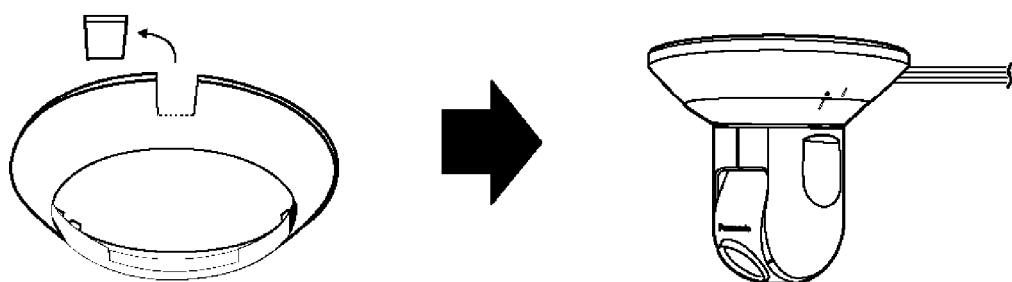
- When removing the Ceiling Mounting Cover, move it in the counterclockwise direction. Adjust both "I" and let down the main

unit.



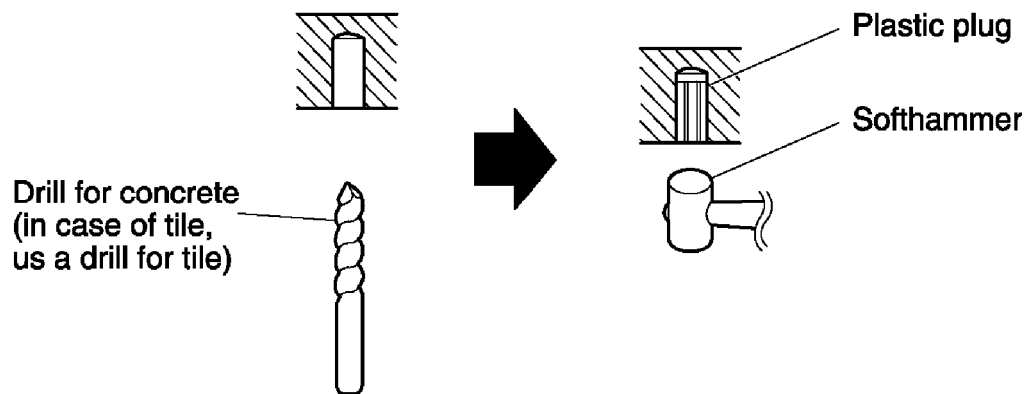
Wiring without making a hole for a cable in the ceiling

- Please follow the steps 1), 3), 4), 5), 6). Making a hole is not necessary.
- Please remove the tab of Ceiling Mounting Cover and wire through the notch.



A Ceiling Mounting example (Making holes on mortar wall)

1. Fit the Ceiling Plate B to the mounting position and put marks.
2. Make holes at the marks and put plastic plugs (customer provided) into them.



Note:

Mortar wall is easy to come off in drilling.

3. Mount the Network Camera.

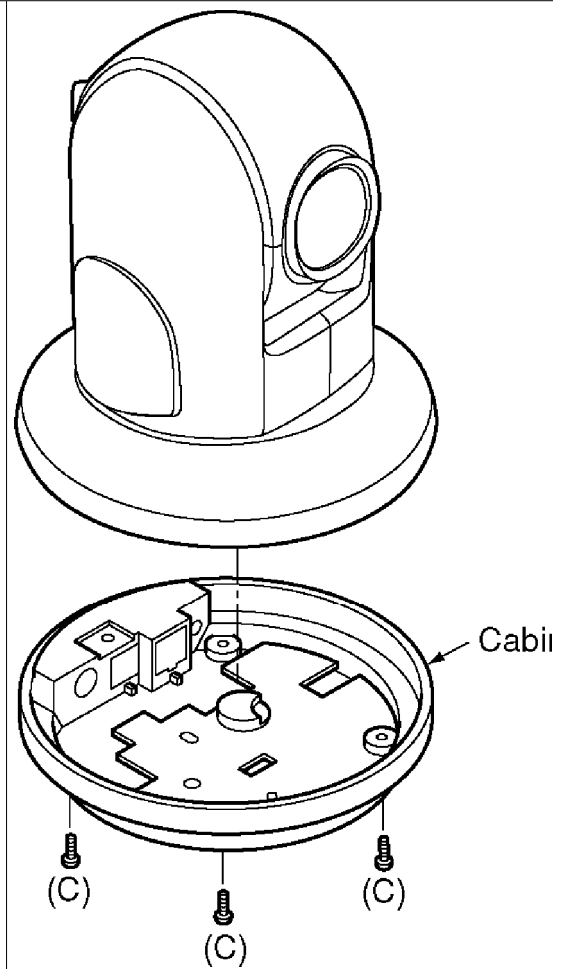
Note:

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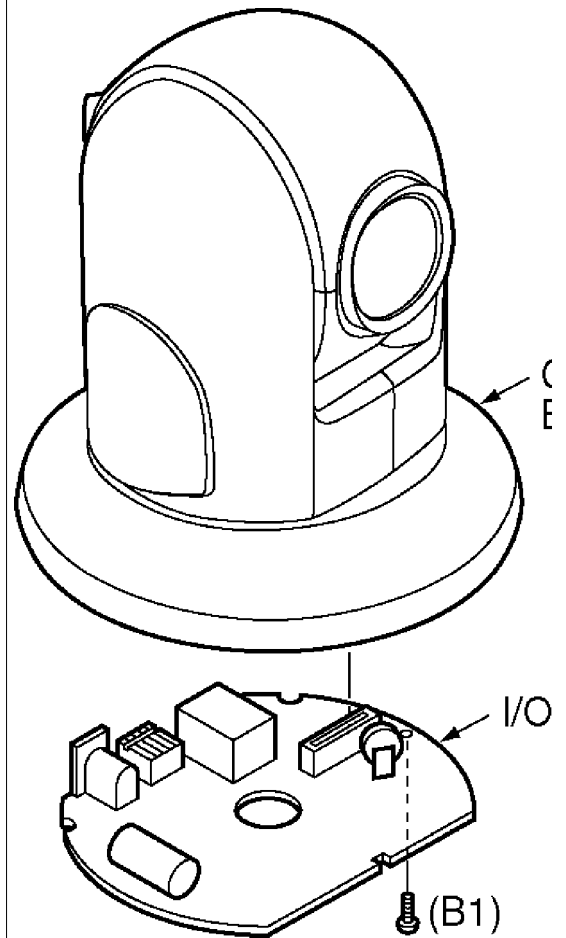
8. DISASSEMBLY INSTRUCTIONS

8.1. DISASSEMBLY INSTRUCTIONS (MAIN BOARD AND I/O BOARD)

1. Remove three Screws (C). And remove the Cabinet Cover.

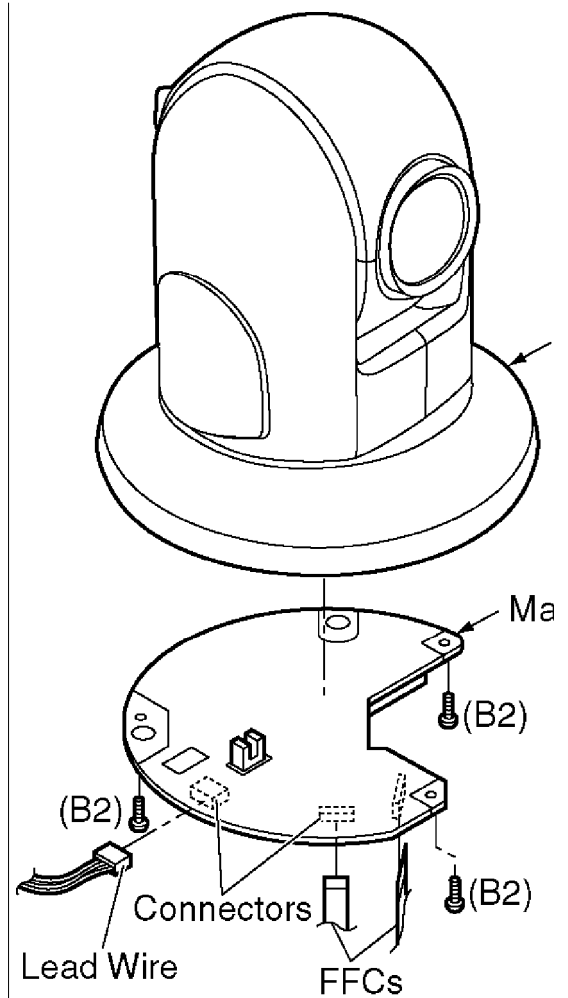


2. Remove the Screw (B1). And remove the I/O Board.



3. Remove the Lead Wire and the two FFCs from the Connectors.

4. Remove three Screws (B2). And remove the Main Board.



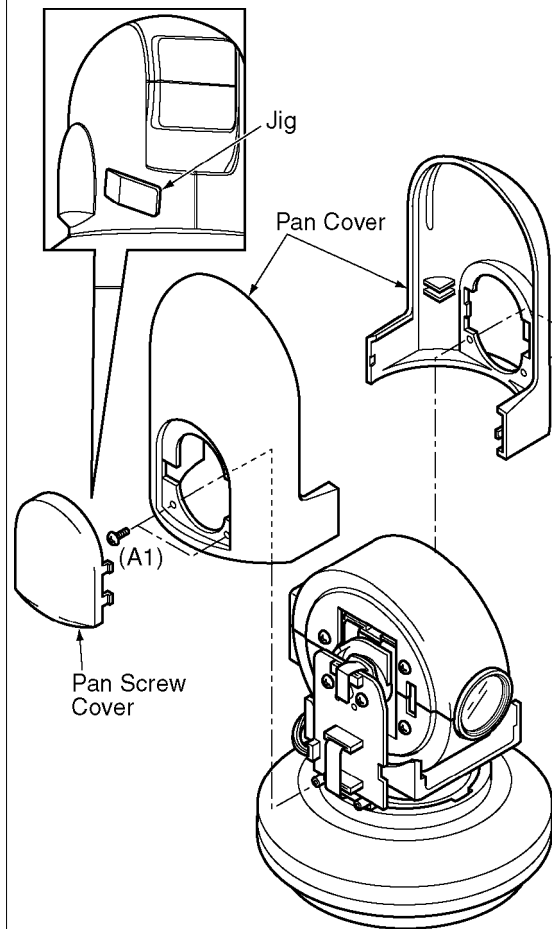
8.2. DISASSEMBLY INSTRUCTIONS (TILT BOARD)

1. Remove the two Pan Screw Covers.

2. Remove four Screws (A1), and remove the two Pan Covers.

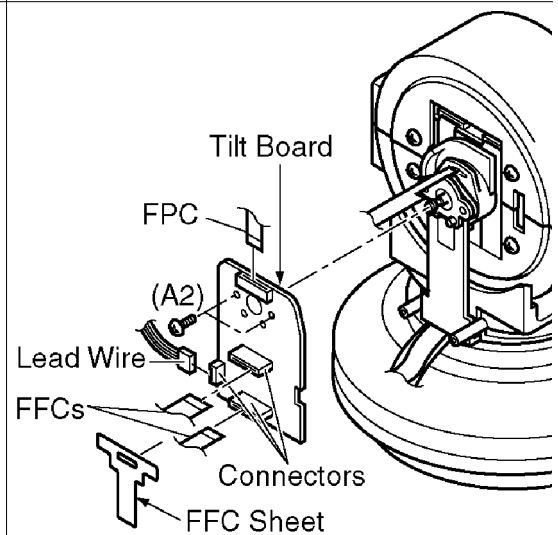
Caution:

When remove Pan Screw Covers, please use the tools not to injure the Jig as illustrated in the figure and Pan Screw Covers.



3. Remove two FFCs, FPC and Lead Wire from the Connectors.

4. Remove two Screws (A2).

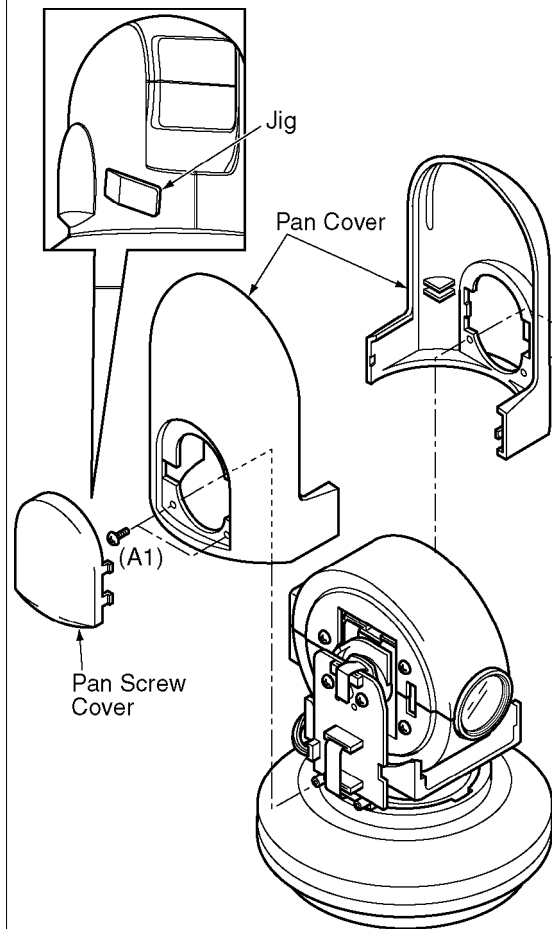


8.3. DISASSEMBLY INSTRUCTIONS (VIDEO BOARD, LENS BOARD AND CCD BOARD)

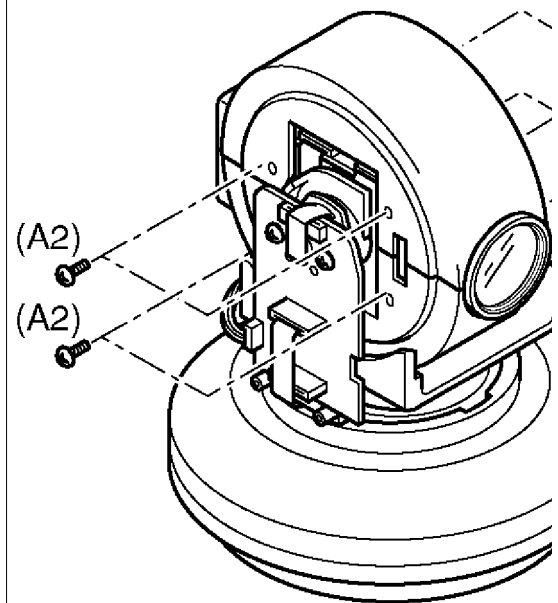
1. Remove the two Pan Screw Covers.
2. Remove four Screws (A1), and remove the two Pan Covers.

Caution:

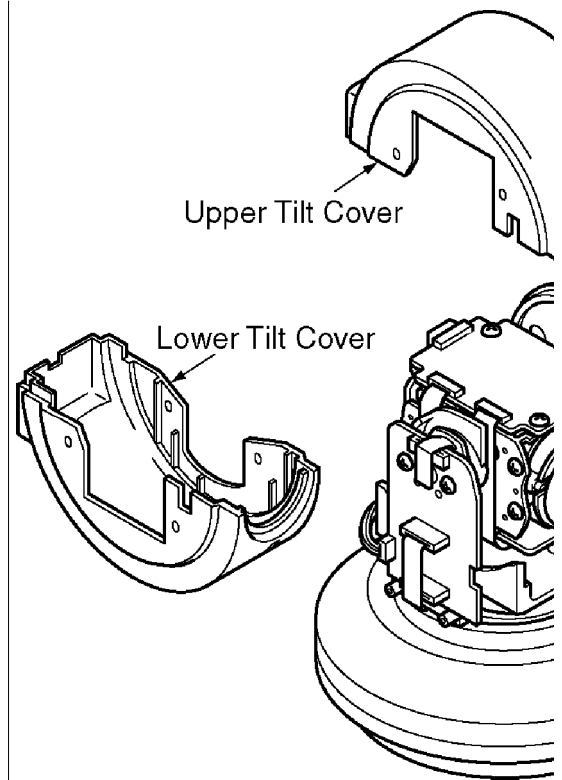
When remove Pan Screw Covers, please use the tools not to injure the Jig as illustrated in the figure and Pan Screw Covers.



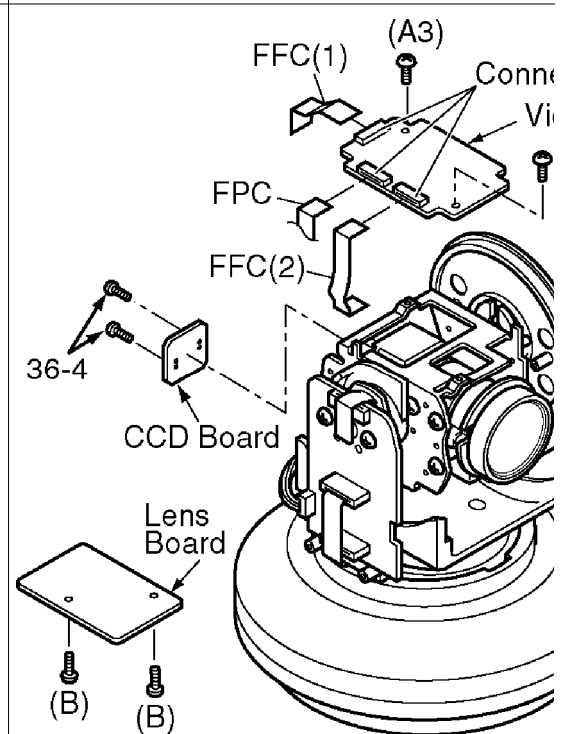
- ### 3. Remove eight Screws (A2).



4. Remove the Upper Tilt Cover. And remove the Lower Tilt Cover.

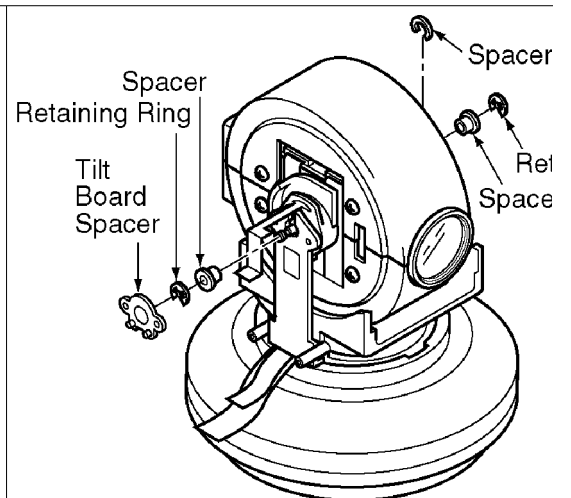


5. Remove the FFC (1), FFC (2) and FPC from the Connector.
6. Remove two Screws (A3). And remove the Video Board.
7. Remove two Screws (B). And remove the Lens Board.
8. Remove two Screws (36-4). And remove the CCD Board.

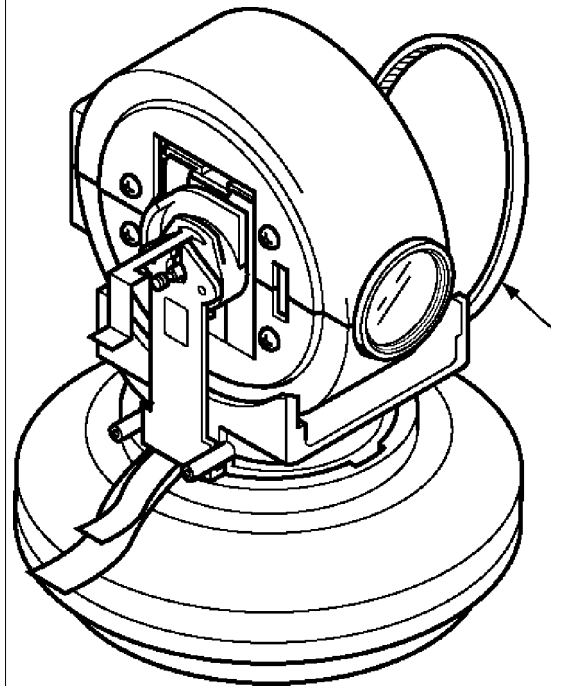


8.4. DISASSEMBLY INSTRUCTIONS (CCD UNIT)

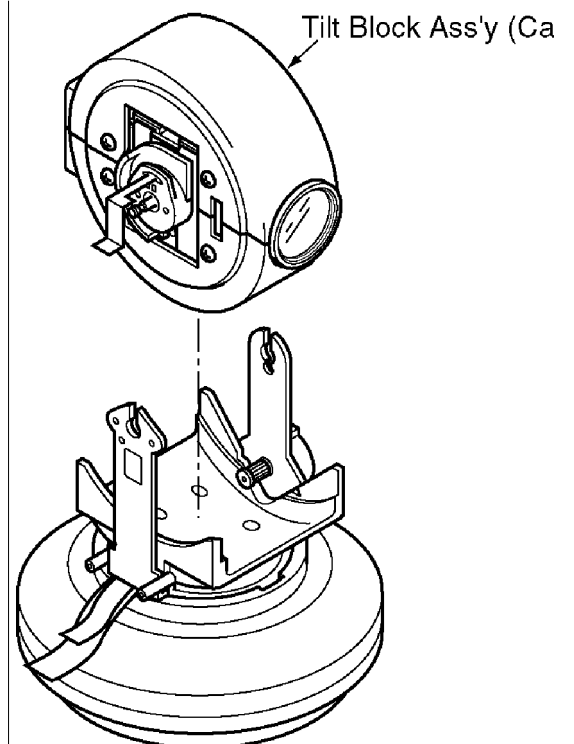
1. Remove the Tilt Board Spacer.
2. Remove two Retaining Rings and three Spacers.
3. Remove Tilt Block Ass'y (Camera Unit) to under direction.



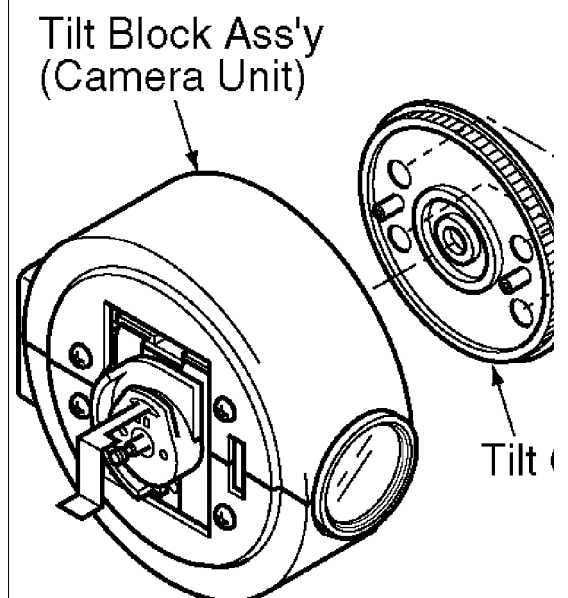
4. Remove the Tilt Belt.



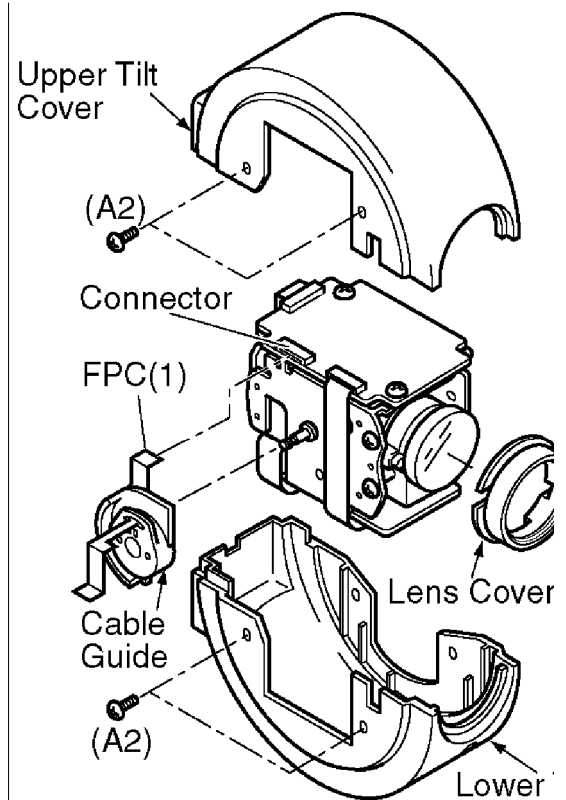
5. Remove the Tilt Block Ass'y (Camera Unit).



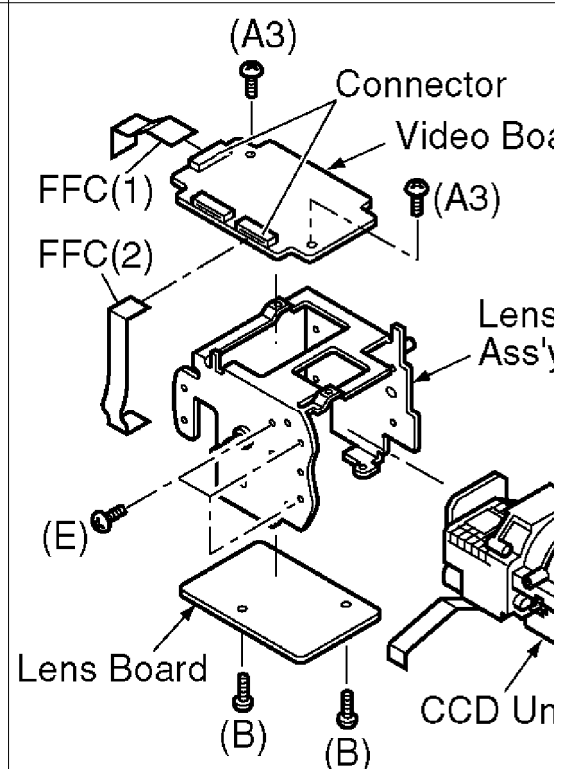
6. Remove four Screws (A1). And remove the Tilt Gear.



7. Remove two Screws (A2). And remove the Upper Tilt Cover and the Lower Tilt Cover.
8. Remove the Lens Cover.
9. Remove the FPC (1) from the Connector. And remove the Cable Guide.

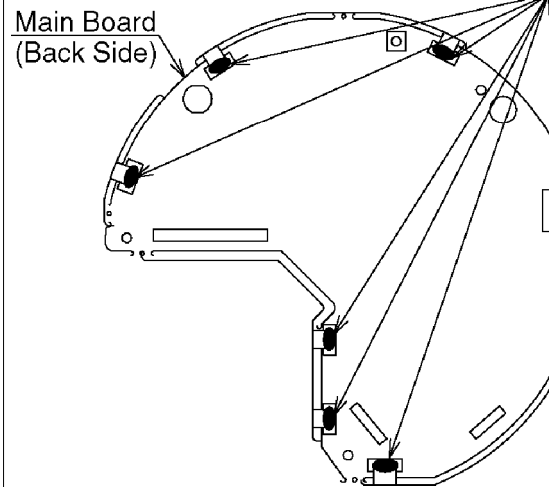


10. Remove the FFC (1) and FFC (2) from the Connector.
11. Remove two Screws (B). And remove the Lens Board.
12. Remove two Screws (A3). And remove the Video Board.
13. Remove three Screws (E). And remove the CCD Unit from the Lens Guide Ass'y.



8.5. THE CAUTIONS AT THE TIME OF DISASSEMBLY

1. Remove the seven place of the solder on back side of the Main Board.



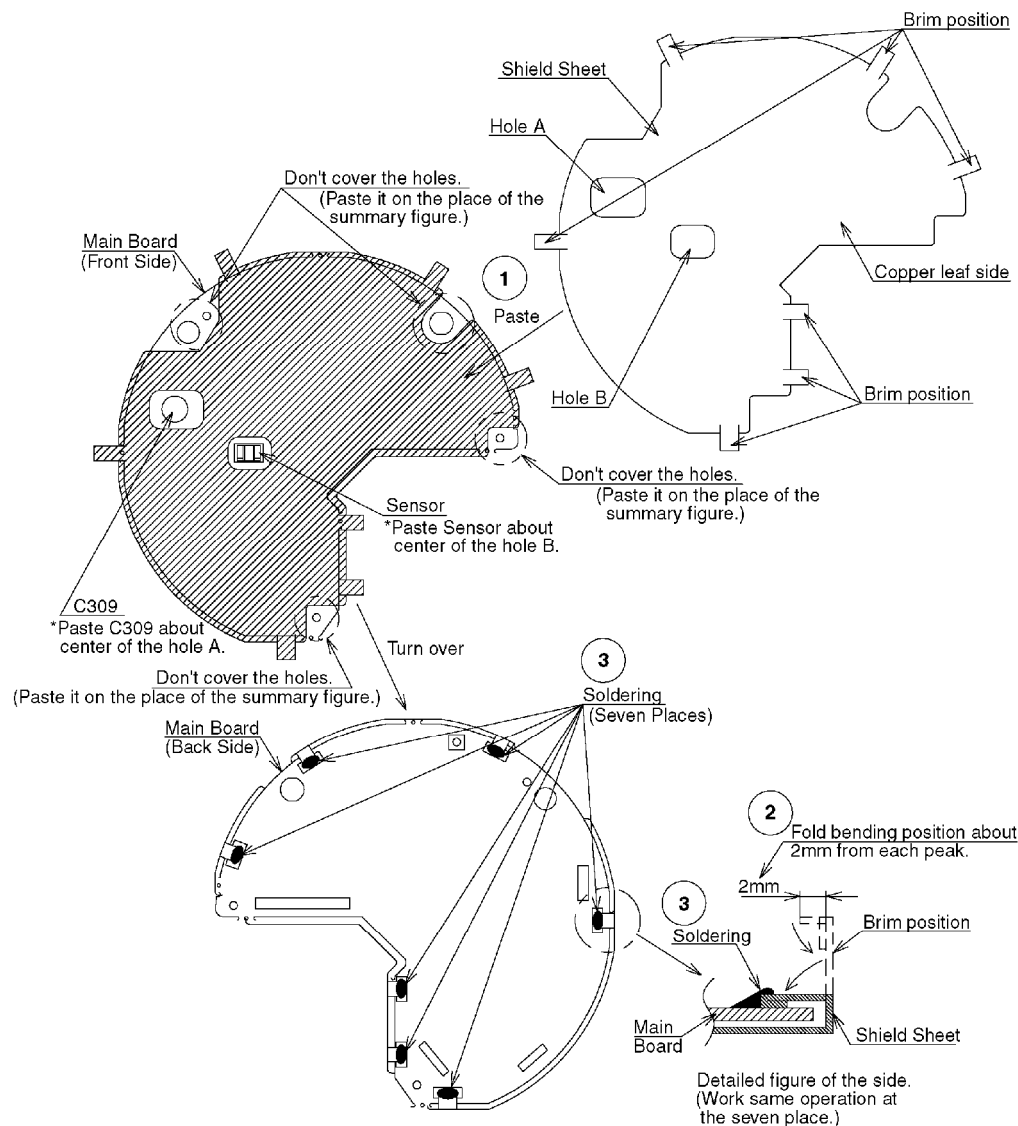
9. THE CAUTIONS AT THE TIME OF ASSEMBLY

9.1. SHIELD SHEET

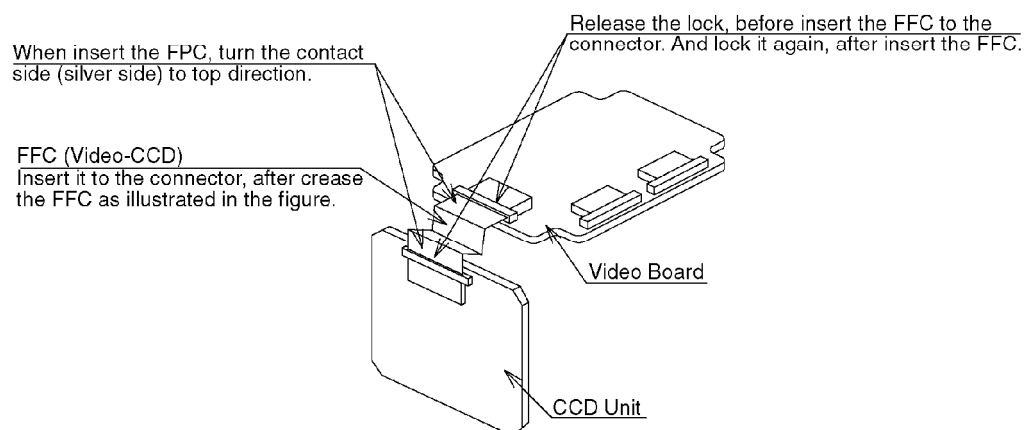
1. Peel off the release paper, and paste the SHIELD SHEET on the surface of the Main Board.
2. Turn the Main Board, and fold the seven places (brim position) about 2 mm to solder from each peak as illustrated in the figure.
3. Solder seven places on the back side of the Main Board.

Caution:

- a. When paste the Shield Sheet, follow the caution about pasting position as illustrated in the figure.
- b. When paste the Shield Sheet, hold all of it not to set higher position than the sensor spacer.
- c. When solder the Shield Sheet, don't touch solder and the solder iron to around places, and don't short circuit them.



9.2. FFC (VIDEO-CCD)



9.3. LEAD WIRE

1. Bind two position of the Pan Motor lead to measure as illustrated

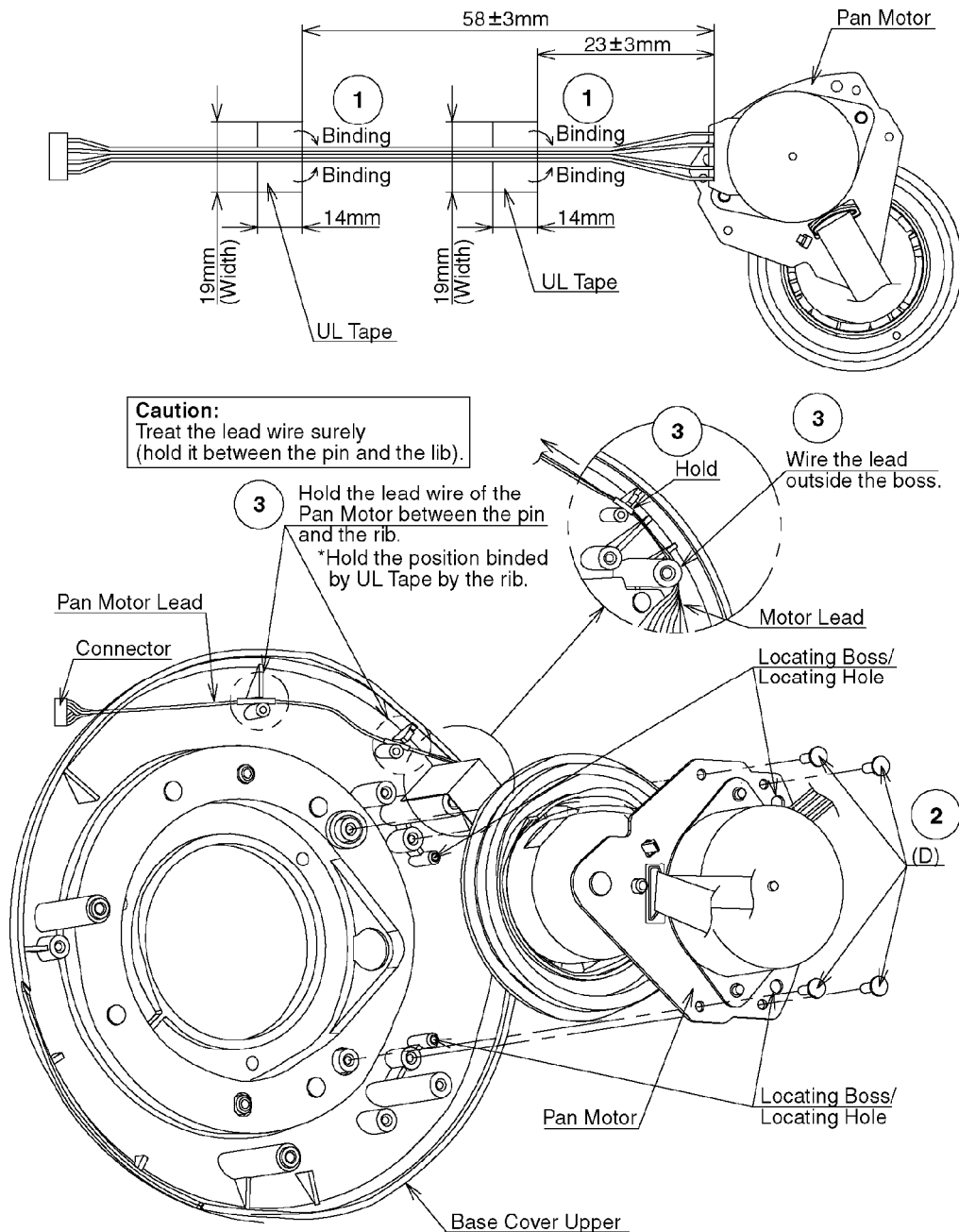
in the figure.

2. Fix the Pan Motor, and (D) four parts securely.

Caution:

Through the locating pin of the cabinet to the locating hole.

3. Wire the lead of the Pan Motor as illustrated in the figure.



9.4. FFC

1. Infold the wide size FFC (21P). (once)

Caution 1:

Mind the way of infolding.

- 2. Infold the wide size FFC (21P). (twice)**

Caution 2:

Mind the way of infolding.

- 3. Insert the wide size FFC (21P) to the connector. (When insert the FFC, turn the contact side (silver side) to out direction.)**

Caution 3:

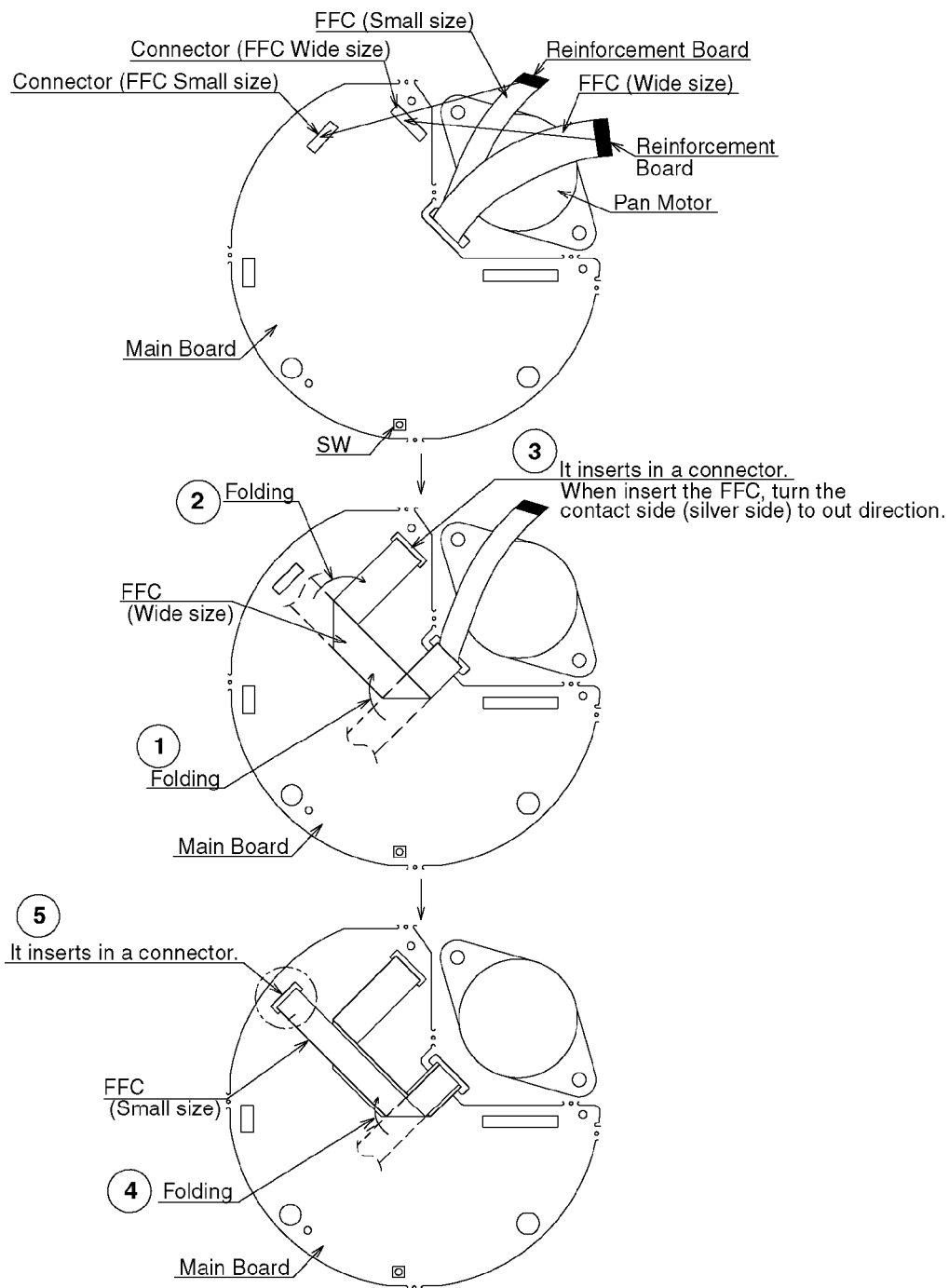
Refer to caution of inserting time, and not insert tilting remarkably.

- 4. Infold the small size FFC (17P). (once)**

Caution 4:

Mind the way of infolding.

- 5. Insert the small size FFC (17P) to the connector.**



9.5. FFC SHEET

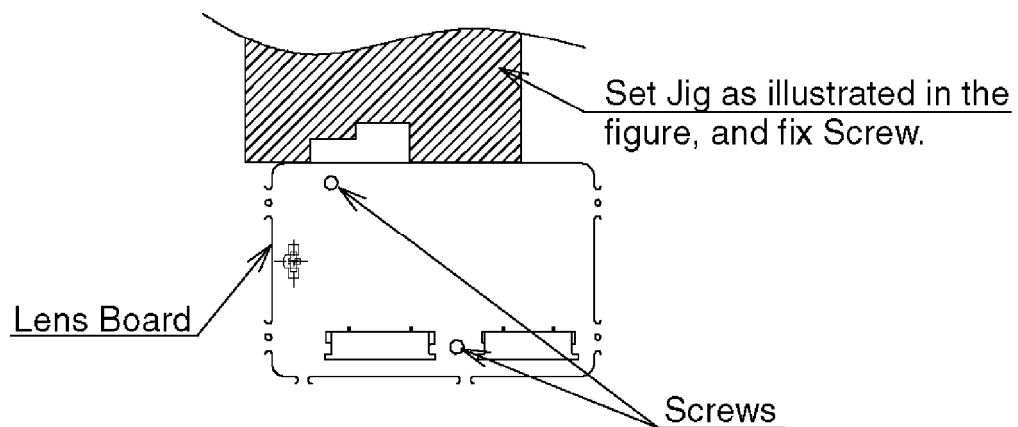
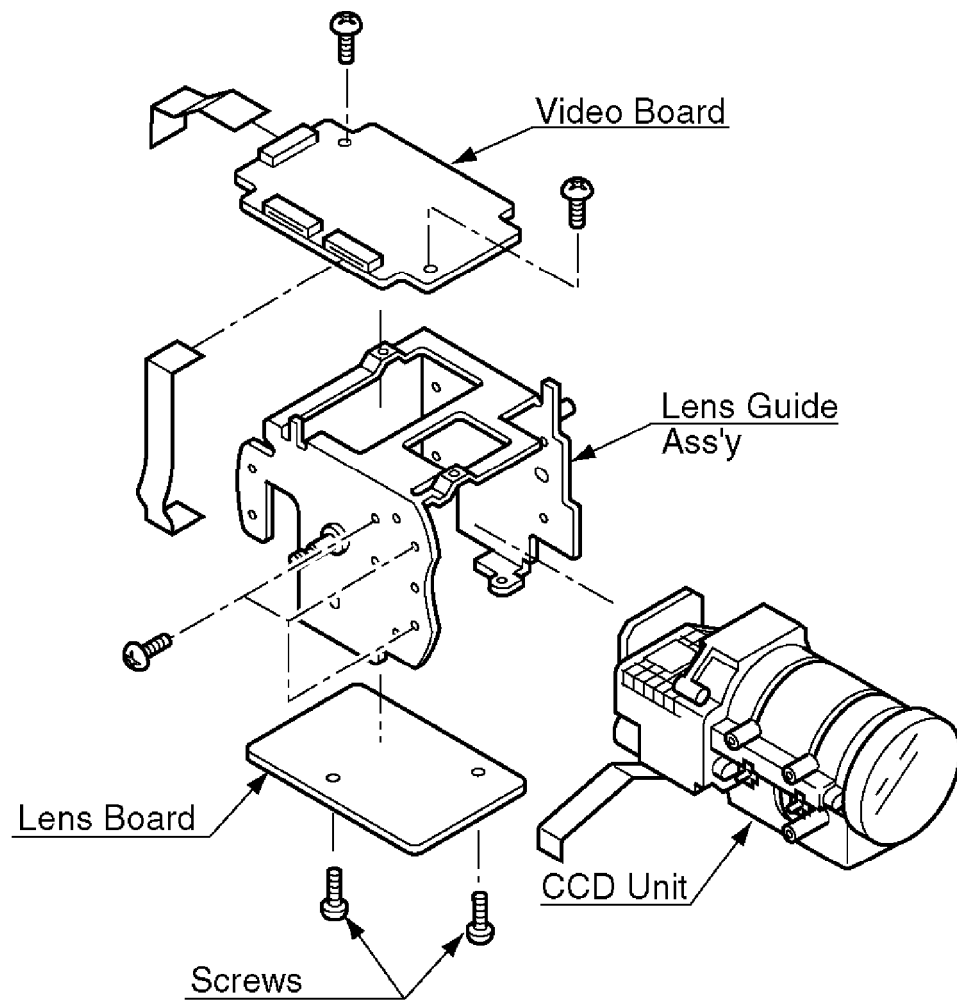
1. Pass both FFCs through the FFC Sheet as shown, and insert A into B.

Caution 1:

Insert all the way to the FFC Sheet.

2. Attach Tilt Board Spacer.

Caution 2:



9.7. CCD UNIT

1. Affix the LPF, CCD Rubber, and CCD Board (in that order) to the

Lens Unit, and secure using 2 Screws.

Caution 1:

Before assembling, remove dust from the inside of the lens as shown.

Caution 2:

Line up the top and bottom of the Lens Unit and CCD Board as shown.

Caution 3:

Insert the locating pins of the Lens Unit into the locating holes of the CCD Board as shown.

Caution 4:

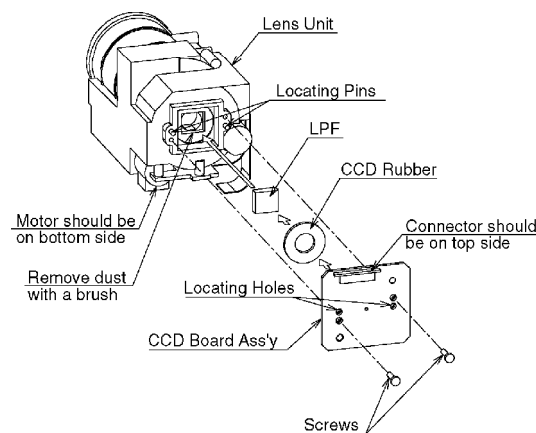
The CCD Rubber can be affixed in any direction. LPF is no inside and outside.

Caution 5:

Inspect the LPF and the surface of the CCD glass with a magnifying glass, and remove any dust before assembling.

Caution 6:

After assembling, lightly shake the Lens Unit. If you hear no rattling, the parts have been assembled securely.



10. ADJUSTMENTS

10.1. TOOLS AND EQUIPMENT FOR ADJUSTMENT AND REPAIR

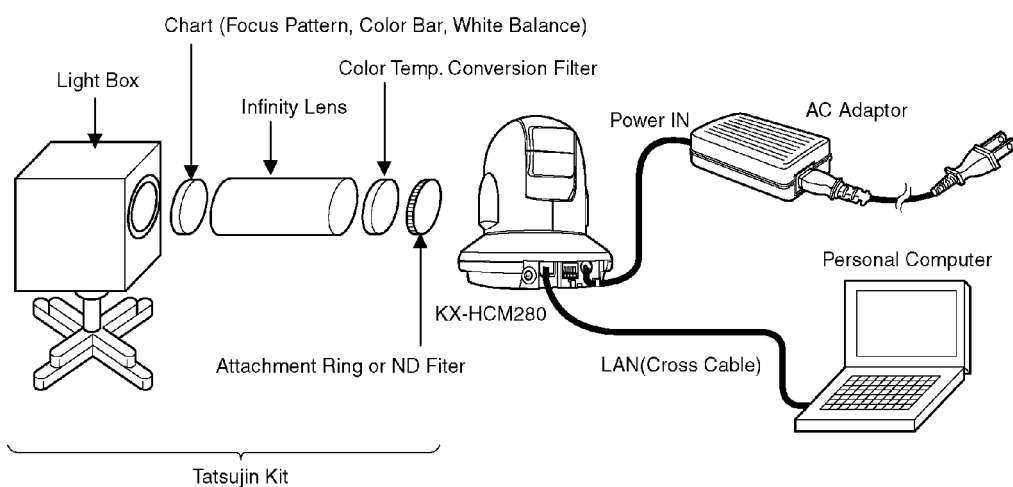
(1) Tatsujin Kit

- Light Box: YTU93072M
- Lamp: YQ20645-001(This is used inside of Light Box)
- Color Bar Chart: YTU92001-071
- White Balance Chart: YTU92001-053
- Focus Pattern Chart: YTU92001-050

- Color Temp. Conversion Filter for 5100K: YTU92001075
- Infinity Lens: YTU90021B
- Attachment Ring: 46mm
- (2) LAN Cable (Cross)
- (3) Personal Computer
- (4) AC Adaptor: Part No. PSLP1242
- (5) HCM280 Service Tool

10.2. PREPARATION

- Cable Connection



Tools and Equipment which need for each adjustment

	Zoom Tracking	IRIS	VIDEO
(1) Tatsujin Kit	O	-	O
-Light Box (with Lamp)			
-Color Bar Chart	-	-	O
-White Balance Chart	-	-	O
-Focus Pattern Chart	O	-	-
-Color Temp. Conversion Filter for 5100K	-	-	O
-Infinity Lens	O	-	O
-Attachment Ring	O	-	O
(2) LAN Cable	O	O	O
(3) Personal Computer	O	O	O
(4) AC Adaptor	O	O	O
(5) HCM280 Service Tool	O	O	O

Note:

Infinity lens must be inserted all the way into light box until reaching stop point.

10.3. LENS ADJUSTMENT PROCEDURE

Lens Adjustment consists of 2 items below:

- **Iris Adjustment**
- **Zoom Trucking Adjust**

Lens Adjustment Program has adjustment modes of individual items and an automatic adjustment mode which adjusts successively the all items.

- (1) Start-up the HCM280 Service Tool.
- (2) Power on the KX-HCM280.

1. Iris Adjustment

Equipment

- **None**

Procedure

1. Connect the Set from PC through LAN.
2. Press the [Iris Adjust] button.
 - **Adjustment completes with no error → Displays “Adjustment OK”**
 - **Adjustment completes with no error → Displays “Adjustment NG”**
3. If “Iris Adjust NG” is displayed, see SECTION 11.5&11.6 TROUBLESHOOTING.

2. Zoom Tracking

Equipment

- **Focus Pattern Chart**
- **Infinity Lens**
- **Light Box**

Procedure

1. Connect the Set from PC through LAN to output image.
2. Set the zoom position to Telephoto End and adjust the position so that the Focus Pattern Chart is displayed in the full screen.
3. Press the [Tracking Adjust] button.
 - **Adjustment completes with no error → Displays “Adjustment OK”**
 - **Adjustment completes with no error → Displays “Adjustment NG”**
4. If “Tracking Adjust NG” is displayed, see SECTION 11.5&11.6 TROUBLESHOOTING.

3. Auto Adjustment

Equipment

- **Focus Pattern Chart**
- **Infinity Lens**
- **Light Box**

Procedure

1. Connect the Set from PC through LAN to output image.
2. Set the zoom position to Telephoto terminal and adjust the position so that the Focus Pattern Chart is display in the full screen.
3. Press the [Auto] button.
 - **Adjustment completes with no error → Displays “Adjustment OK”**
 - **Adjustment completes with no error → Displays the error item**
4. See SECTION 11.5&11.6 TROUBLESHOOTING for the error item.

10.4. VIDEO ADJUSTMENT PROCEDURE

1. Tools

- **Infinity Lens**
- **Light Box**
- **Color Bar Chart**
- **White Balance Chart**
- **Color Temp. Conversion Filter for 5100K**

2. Adjustment Procedure

1. **Start-up the HCM280 Service Tool.**
2. **Install the Active-X for the Video Adjustment to the PC.**
3. **Turn on the Set.**
4. **Connect from the PC through LAN to output an image. (The image is 640 x 480 in the Favor clarify mode.)**
5. **Press the "Video Adjustment" button.**
6. **After displaying "Please shoot White Balance Chart", image the White Balance Chart, and adjust the position and zoom range so**

- that the White Balance Chart is displayed in the full screen.
7. Press the "OK" button.
 8. After displaying "Please shoot Color Bar Chart", change the White Balance Chart to the Color Bar Chart. Adjust the position and zoom range so that the Color Bar Chart is displayed in the full screen and the target on the screen is placed in the center of each color, as shown in the following Figure.
 9. Press the "OK" button.
 10. When the adjustment completes with no error, the "Adjustment OK" is displayed.
When the adjustment completes with an error, the error item is displayed.

*In the case of "Adjustment NG", see SECTION 11.5 TROUBLESHOOTING of the TILT BLOCK ASSY (Camera Unit).

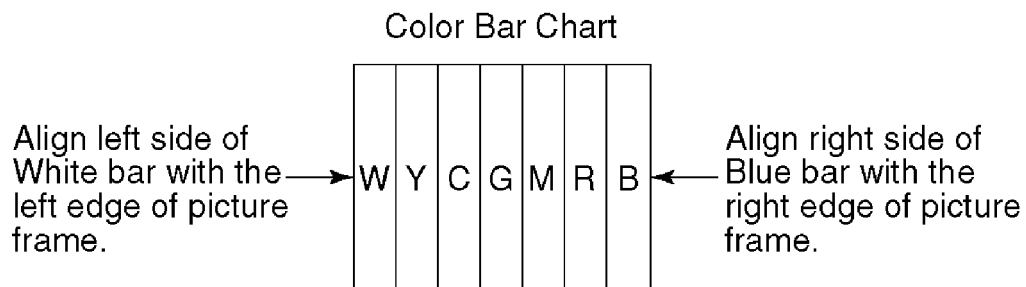
Items which needs the adjustment

Items	Iris Adjustment	Trucking Adjustment	Video Adjustment
Replace the Lens Unit	O	O	-
Replace the CCD Circuit Board	-	O	O
Replace the IR Cut Filter (PS0F1101)	-	O	O
CCD Unit (Lens Unit + CCD Circuit Board)	O	O	O
Replace the Lens Circuit Board	O	O	O
Repair the Lens Block	O	-	-
Repair the Zoom/Focus Block	-	O	-
Replace the EEPROM (IC1009)	O	O	O
Dark Screen	O	-	O
Discolored	-	-	O
Out of Focus	-	O	-

Note:

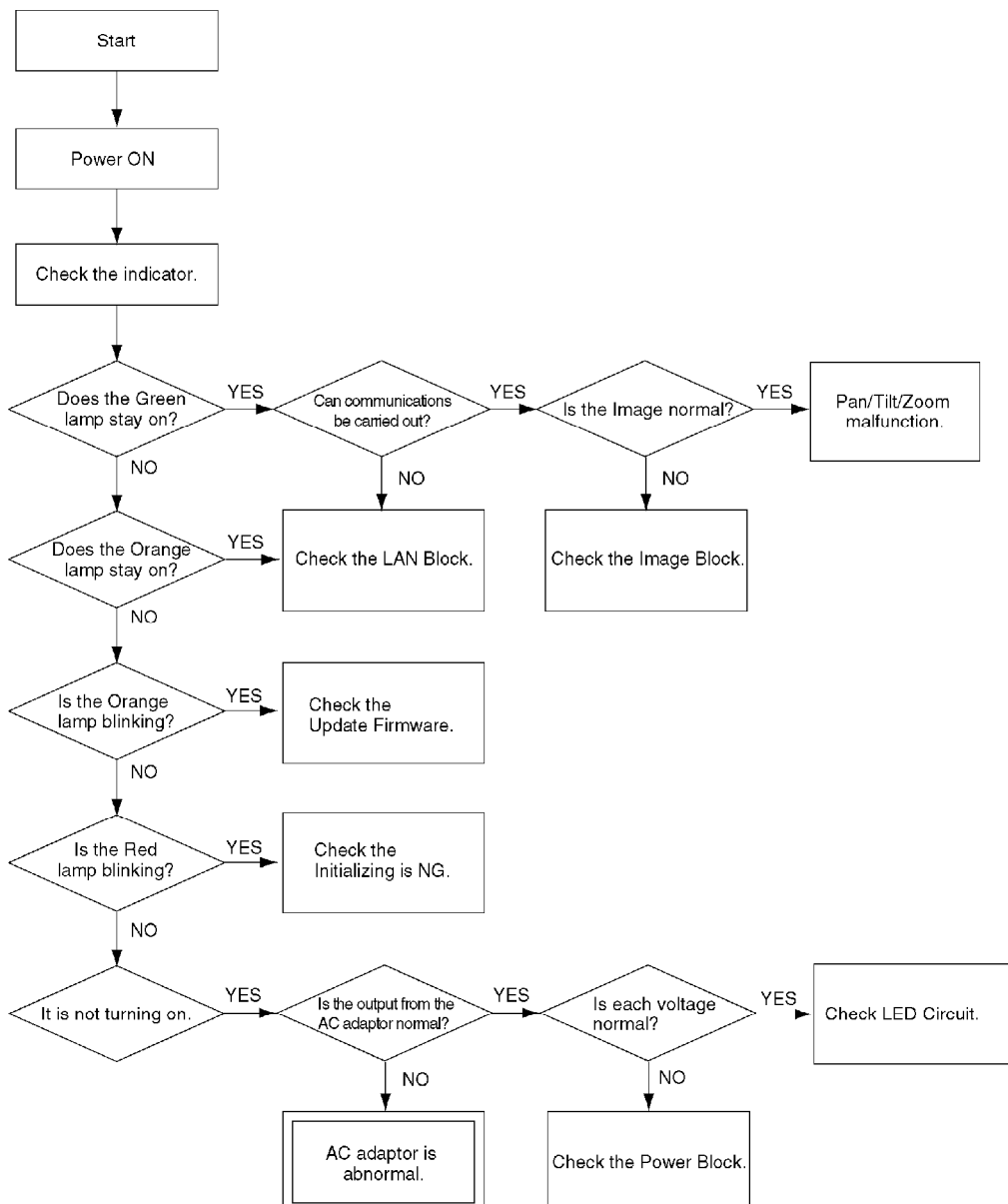
Infinity lens must be inserted all the way into light box until reaching stop point.

- Viewing angle when taking the color bar chart

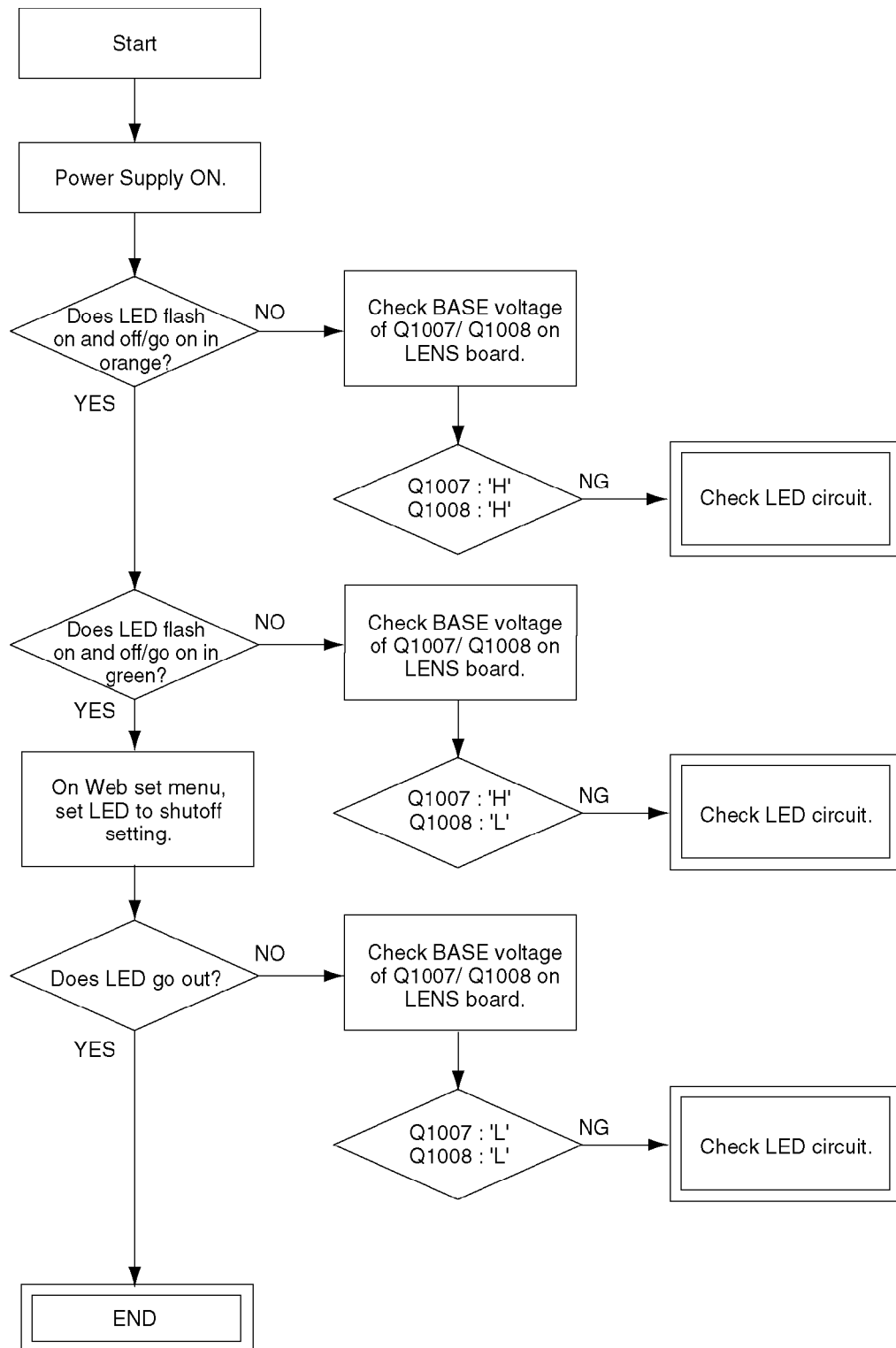


11. TROUBLE SHOOTING

11.1. STARTUP OPERATION

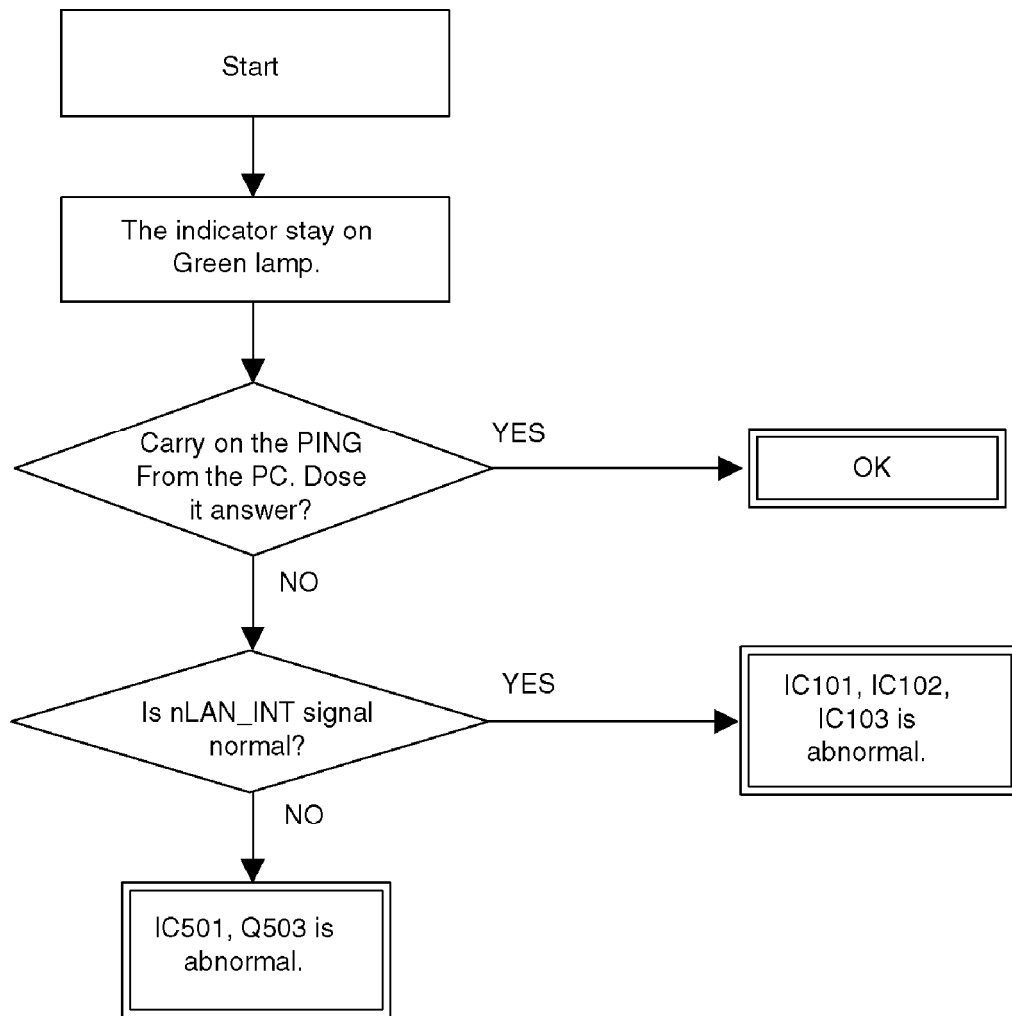


11.2. LED CIRCUIT CHECK

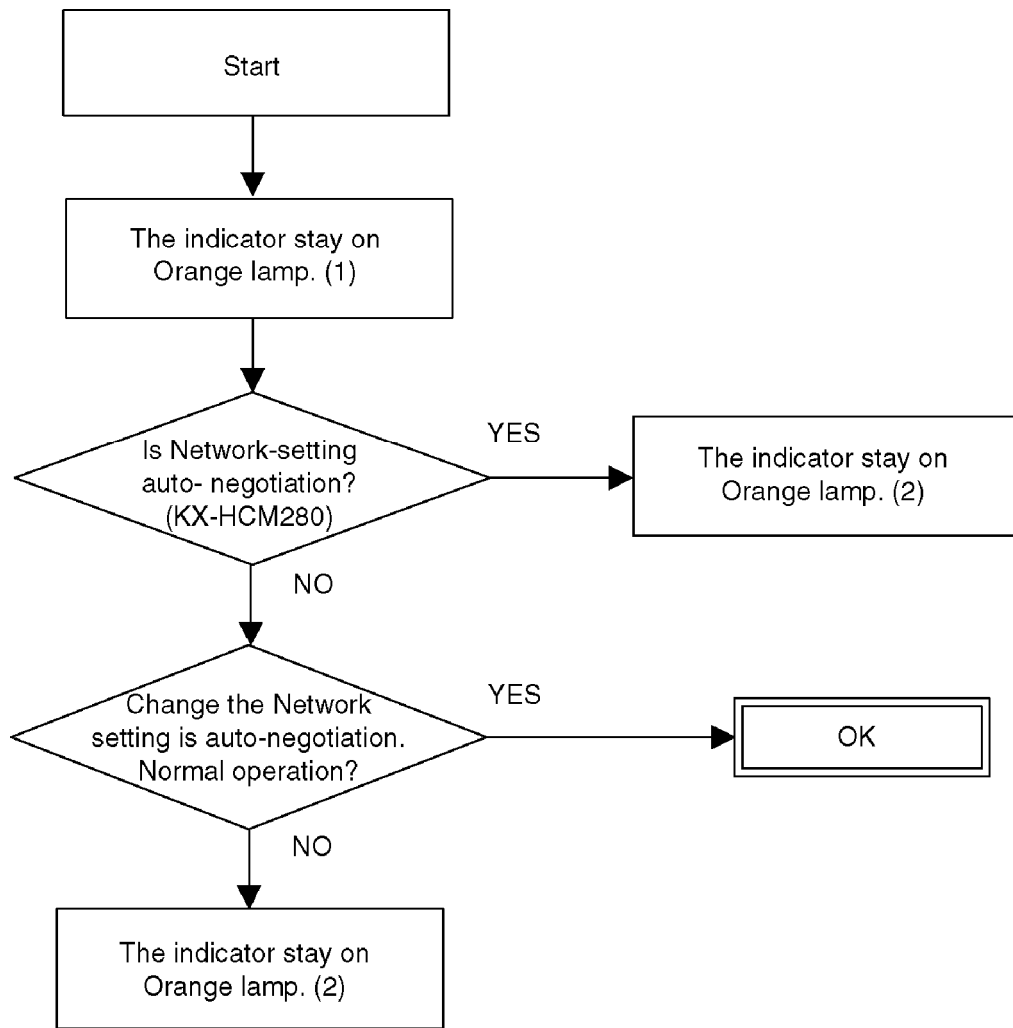


11.3. LAN BLOCK CHECK

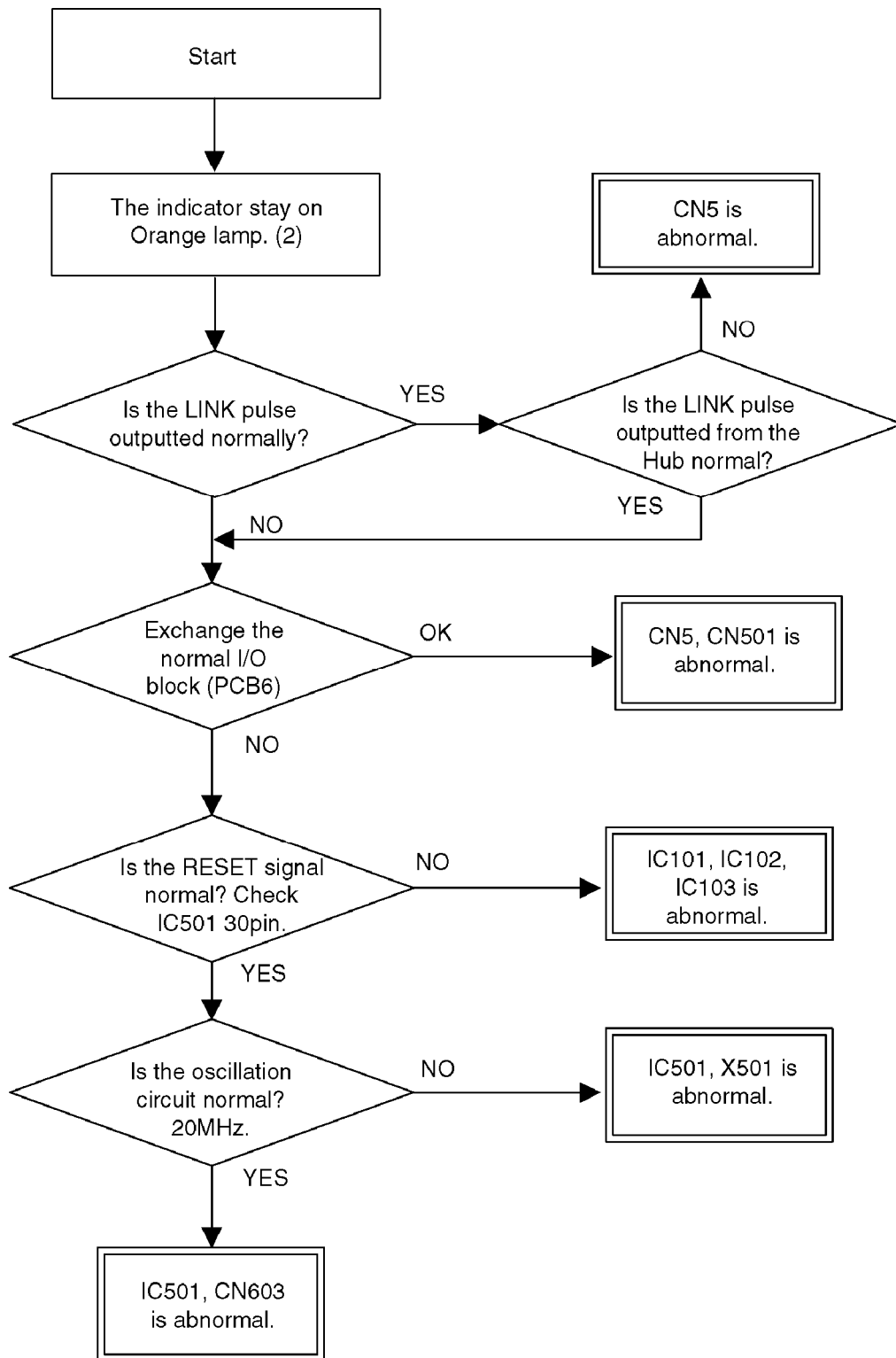
11.3.1. Green Lamp



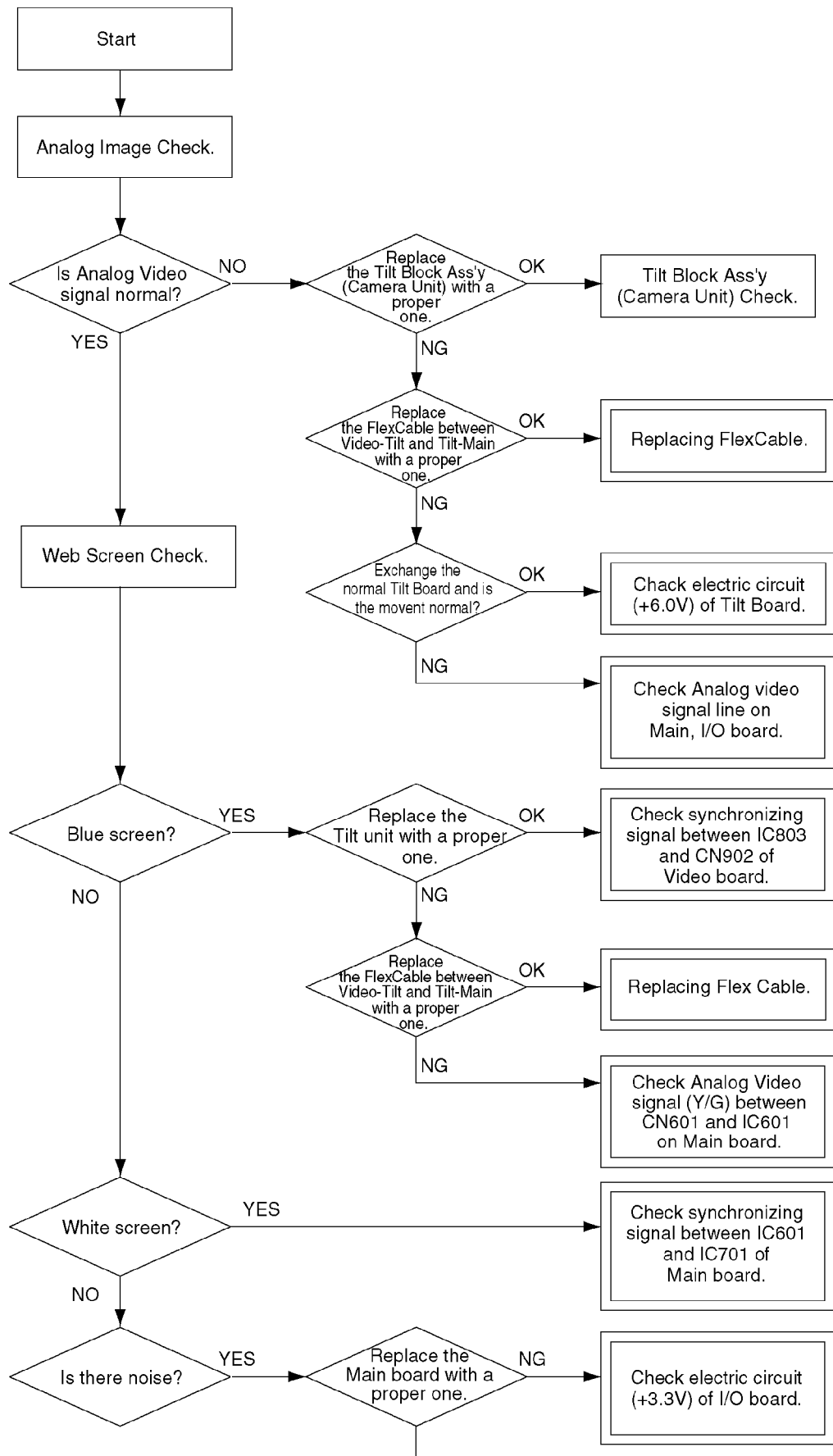
11.3.2. Orange Lamp (1)



11.3.3. Orange Lamp (2)



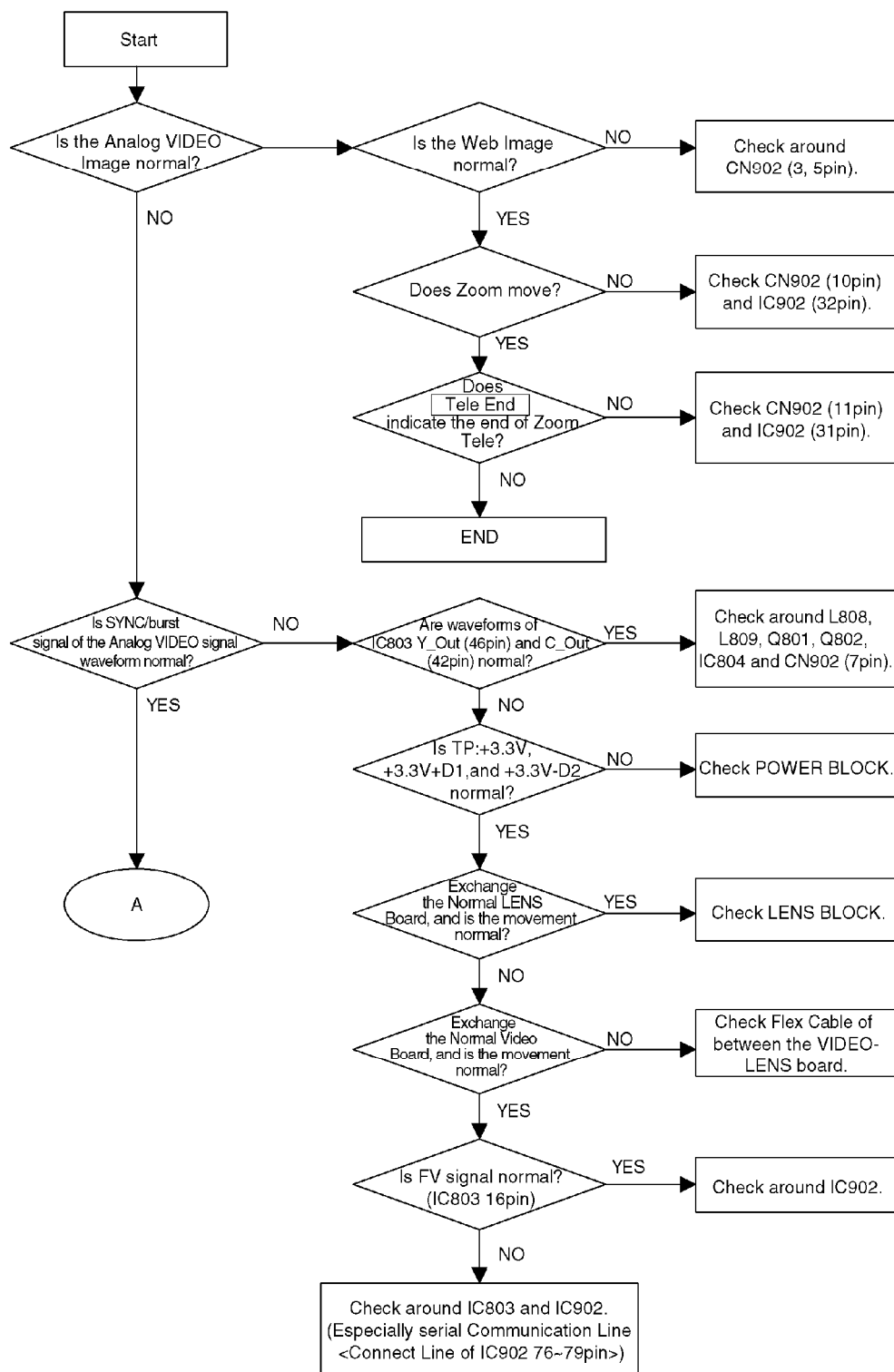
11.4. IMAGES BLOCK CHECK

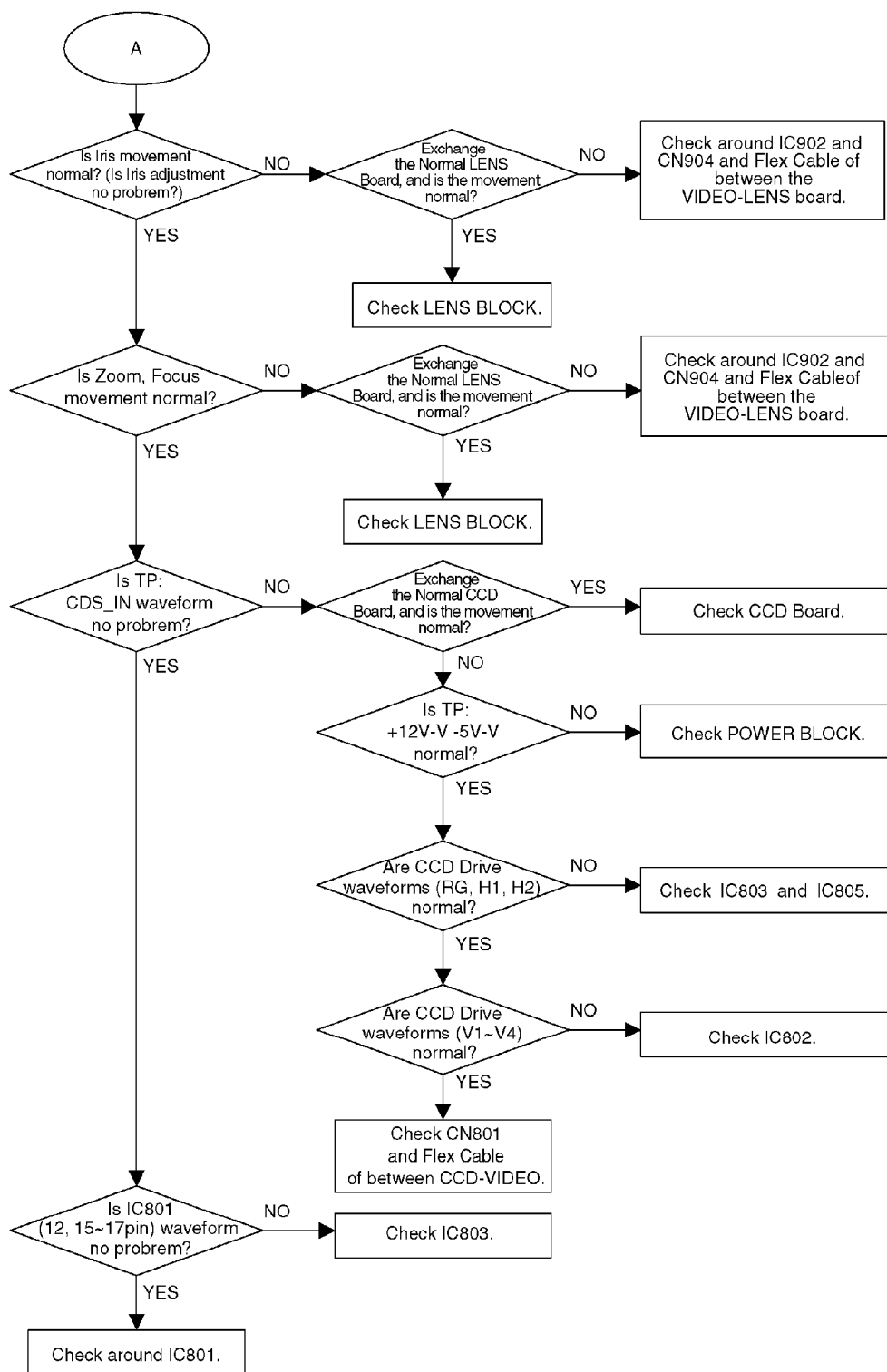


OK

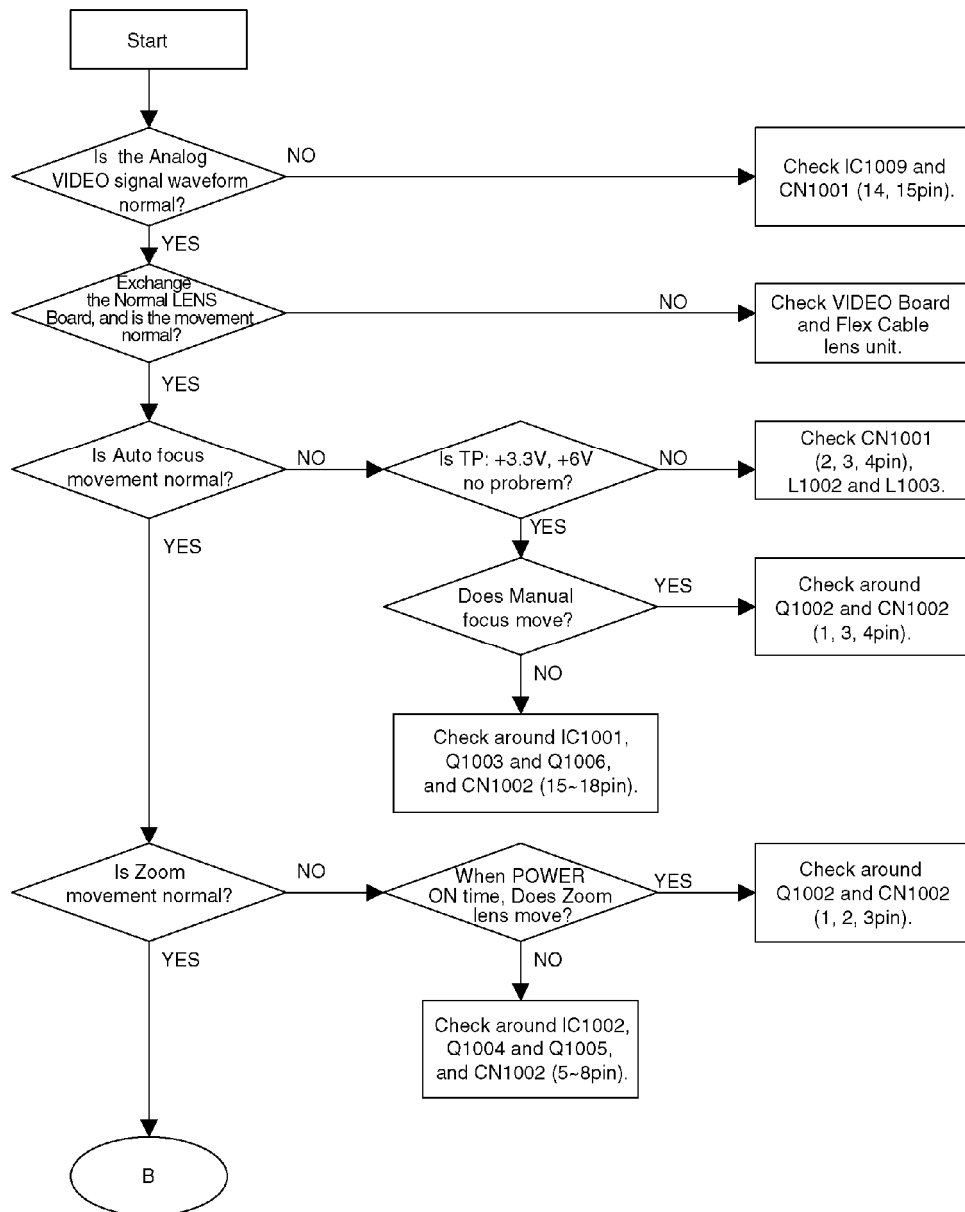
Check CN601, IC601 peripheral circuit and IC701, IC702 peripheral circuit on Main board.

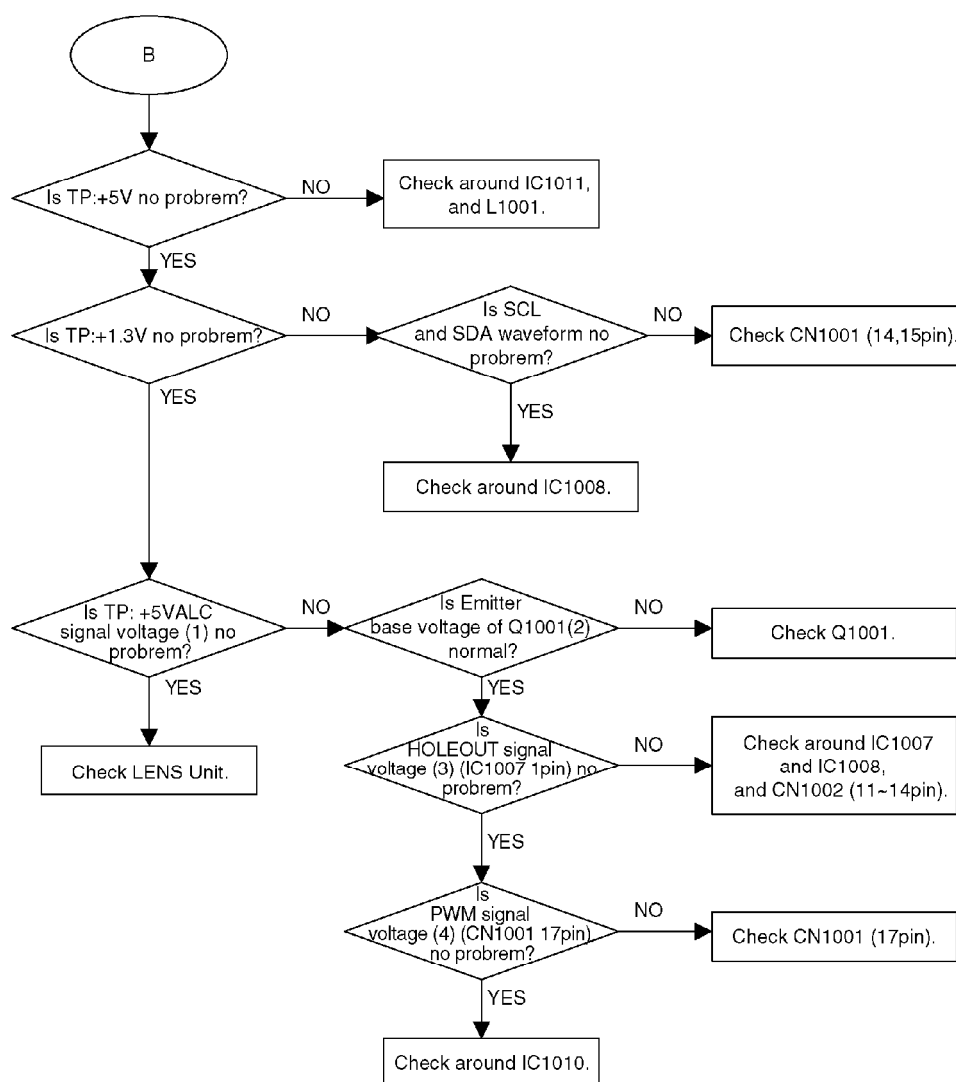
11.5. TILT BLOCK ASSY (CAMERA UNIT) CHECK





11.6. LENS PCB CHECK

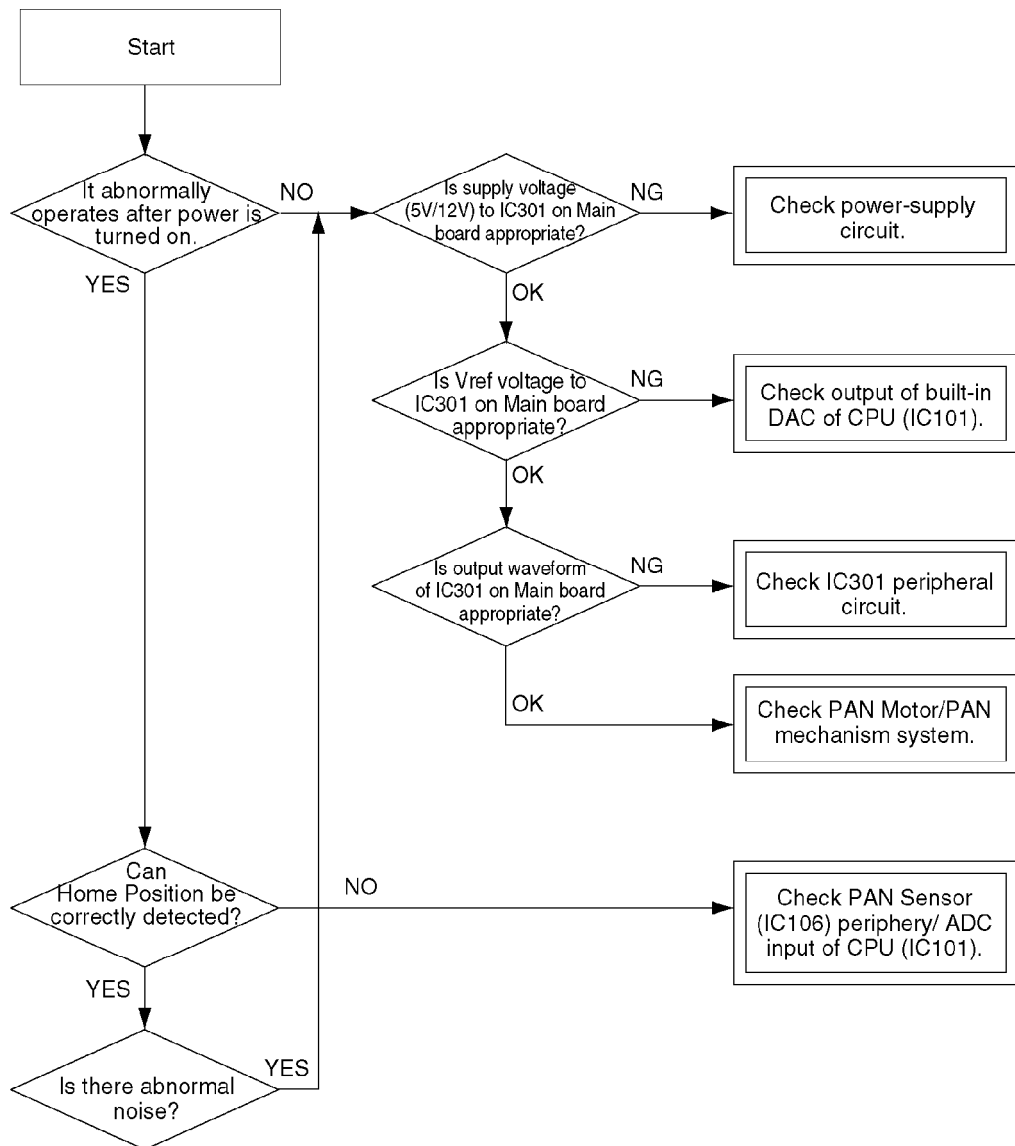




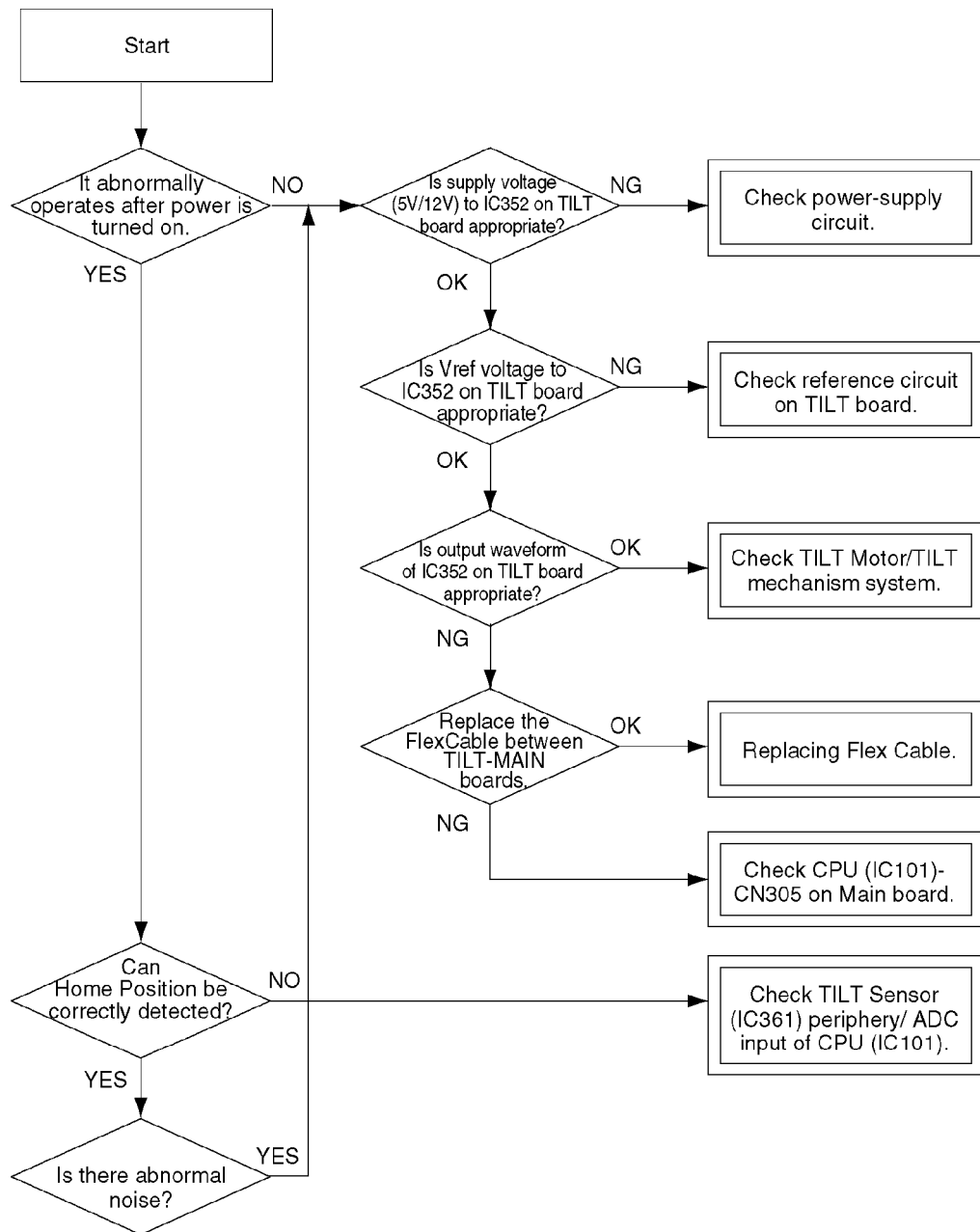
- (1) +5VALC Voltage : Iris OPEN time=about 4 V, CLOSE time=0V
<AE move time : Image blackness time=about 4V>
- (2) Q1001 Emitter base voltage : Emitter voltage=Base voltage-about 0.7V
- (3) HOLEOUT voltage : Iris OPEN time=about 3V, CLOSE time=about 1V
- (4) PWM voltage : Iris OPEN time=about 2V, CLOSE time=0V

11.7. OTHER OPERATION CHECK

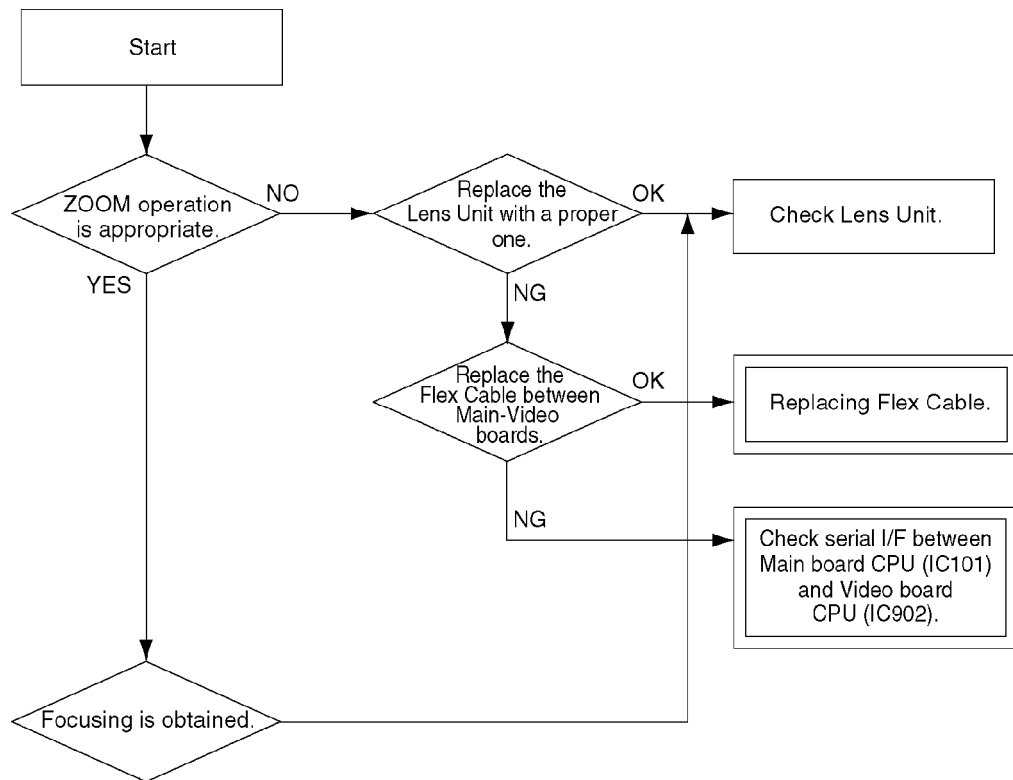
11.7.1. PAN Operation Check



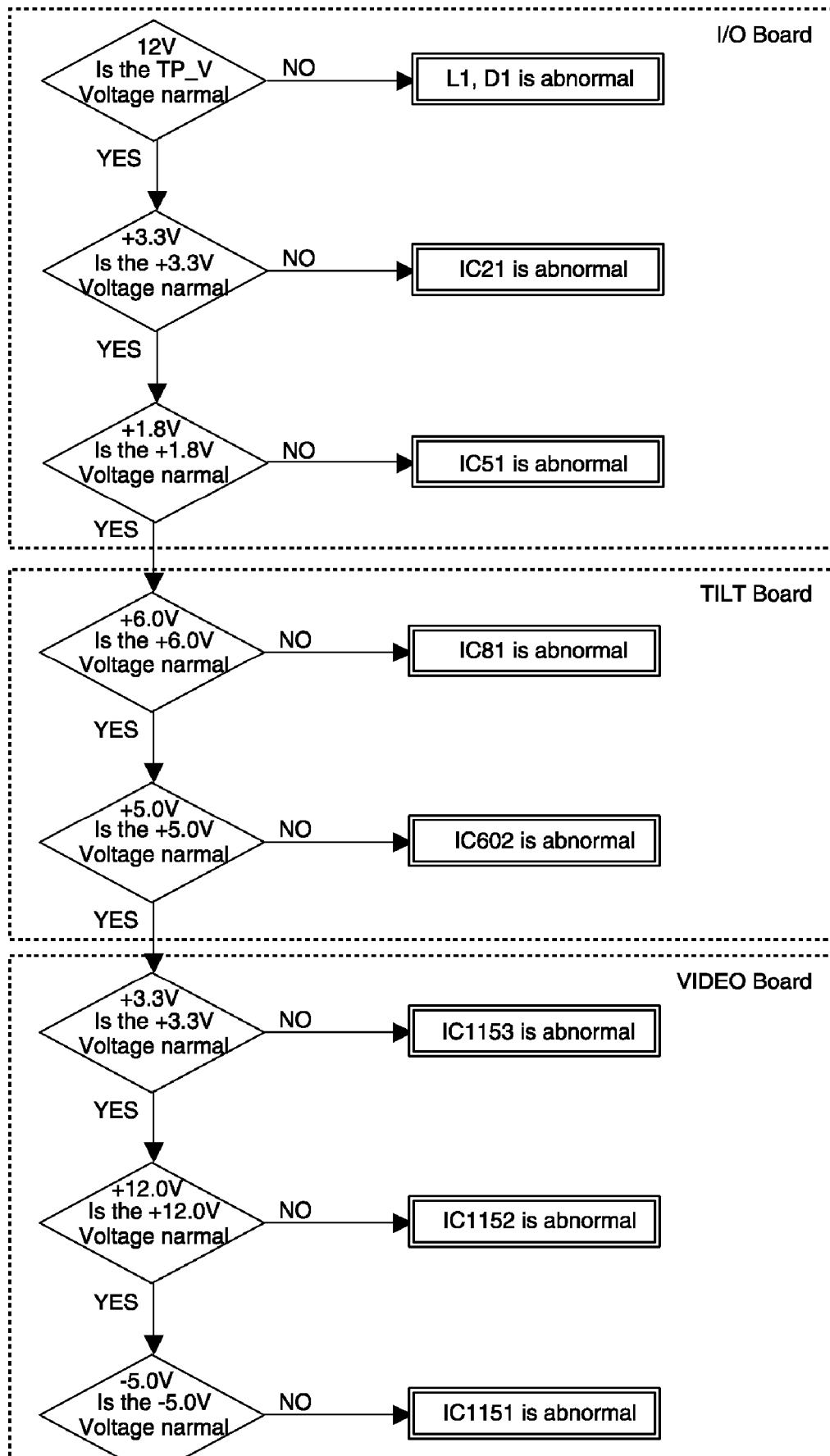
11.7.2. TILT Operation Check

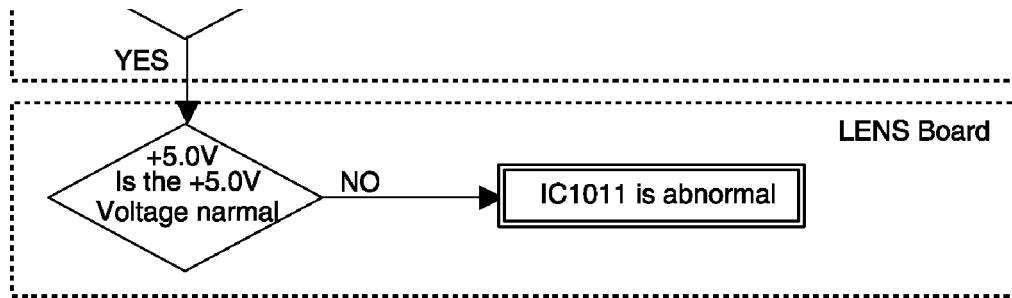


11.7.3. ZOOM Operation Check



11.8. POWER SUPPLY BLOCK CHECK





11.9. CAMERA WILL NOT INITIALIZE

When turning on the power, CPU makes a check using the self-diagnosis function. Check being able to the access to the device described below.

When the self-diagnosis function of the device described below is NG turning on the power, CPU makes a check using the LED indicator red-blinks.

1. RTC (IC107): Even when RTC access is carried out normally, if the values of clock data CPU read are wrong, the LED indicator red-blinks.1

*A backup battery (BAT1), which backs up RTC, is mounted on the I/O board (PCB3), so detaching the I/O board from the main board clears clock settings. In this case, make clock settings again.

2. LAN CONTROLLER (IC501): Read/Write Test of Internal Register
3. SDRAM (IC103): Read/Write Test
4. JPEG CODEC (IC701): Read/Write Test of Internal Register

*Several Camera informations include self-diagnosis is shown by following Status Screen.

Status

1. Version

Hardware	5100004900
Firmware(Boot)	1.60u
Firmware(Application)	1.60v
Firmware(Camera)	0.36

2. Network

MAC Address	00-80-f0-33-00-00
IP Address	10.75.83.232
Subnet Mask	255.255.255.0
Default Gateway	
Primary DNS Server	
Secondary DNS Server	
DHCP Server	
Host Name	
Lease Time	0
Lease Renewal Time	0
Lease Rebinding Time	0
DDNS Server	www.miemasu.net
DDNS Status	Not Used

3. Protocol

Protocol	Status	Count
SMTP	Success	0
	Connection Error	0
	Communication Error	0
POP3	Success	0
	Connection Error	0
	Login Error	0
FTP	Success	0
	Connection Error	0
	Login Error	0
NTP	Success	0
	Communication Error	0
	Communication Error	0
DNS	Success	0
	Connection Error	0
	Communication Error	0
DDNS	Success	0
	Connection Error	0
	Communication Error	0

4. Diagnosis

Hardware(Main)	0000000000
Hardware(Camera)	00007F7F7F

(a). Hardware Information : AABBCDDDEE
AA : Model information (... KX-HCM*)

	US
0	01
8	11
230	21
270	31
250	41
280	51

BB : DDNS
Inetcam&Viewnetcam (40),
KME (00), CE (80), TS (C0)
CC : ACL...Access Control List
Non (00) Normal, Normal (10), All(20)
DD : PTZF...Pan/Tilt/Zoom/Focus
Appoint belowing readings as OR.
PT (08), Z (40), F (01)
EE : Language/Nation
US (00), Jap (01), CE (04),
Italian (05), French (07),
German (09), Spanish (0b)

(b). DDNS Movement condition
Not Used,
First condition (0),
Initializing (1),
IP Address renewal succeed (2),
IP Address renewal miss (3)

(c).Diagnosis
Hardware (Main) : AABBCDDDEE
AA : 00
BB : System status Normal (00),
Abnormal (Except 00)
CC : JPEG Normal (00),
Abnormal Dsp(FF), Ram(FE),Flash(FD)
DD : Pan Normal (00), Abnormal (Except 00)
EE : Tilt Normal (00), Abnormal (Except 00)
Hardware(Camera) : AABBCDDDEE
AA, BB : Reserve
CC : Camera parts Normal (7F), Abnormal (Except 7F)
DD : Focus parts Normal (7F), Abnormal (Except 7F)
EE : Zoom parts Normal (7F), Abnormal (Except 7F)

11.10. UPDATE FIRMWARE

11.10.1. Update Firmware

Update Firmware window allows the user to install the latest version of the Network Camera internal operating system (Application and Camera firmware). In most cases, this will never be necessary. Changes may be necessary to accommodate new operating systems or new web browsers that are not shown on Operating Instructions. In those cases, Update Firmware would be available from the Network Camera Technical Support Site at <http://panasonic.co.jp/pcc/en/>. Check the current firmware version on Operating Instructions.

Note:

- **Do not turn off the power during Update Firmware. If the operation of Update Firmware is stopped, refer to Operating Instructions.**
- **Buffered Images are erased when performing Update Firmware.**

The upgrade of the software for application is practiced to rewrite Flash memory (IC102) on the Main board by CPU (IC101) on the Main board.

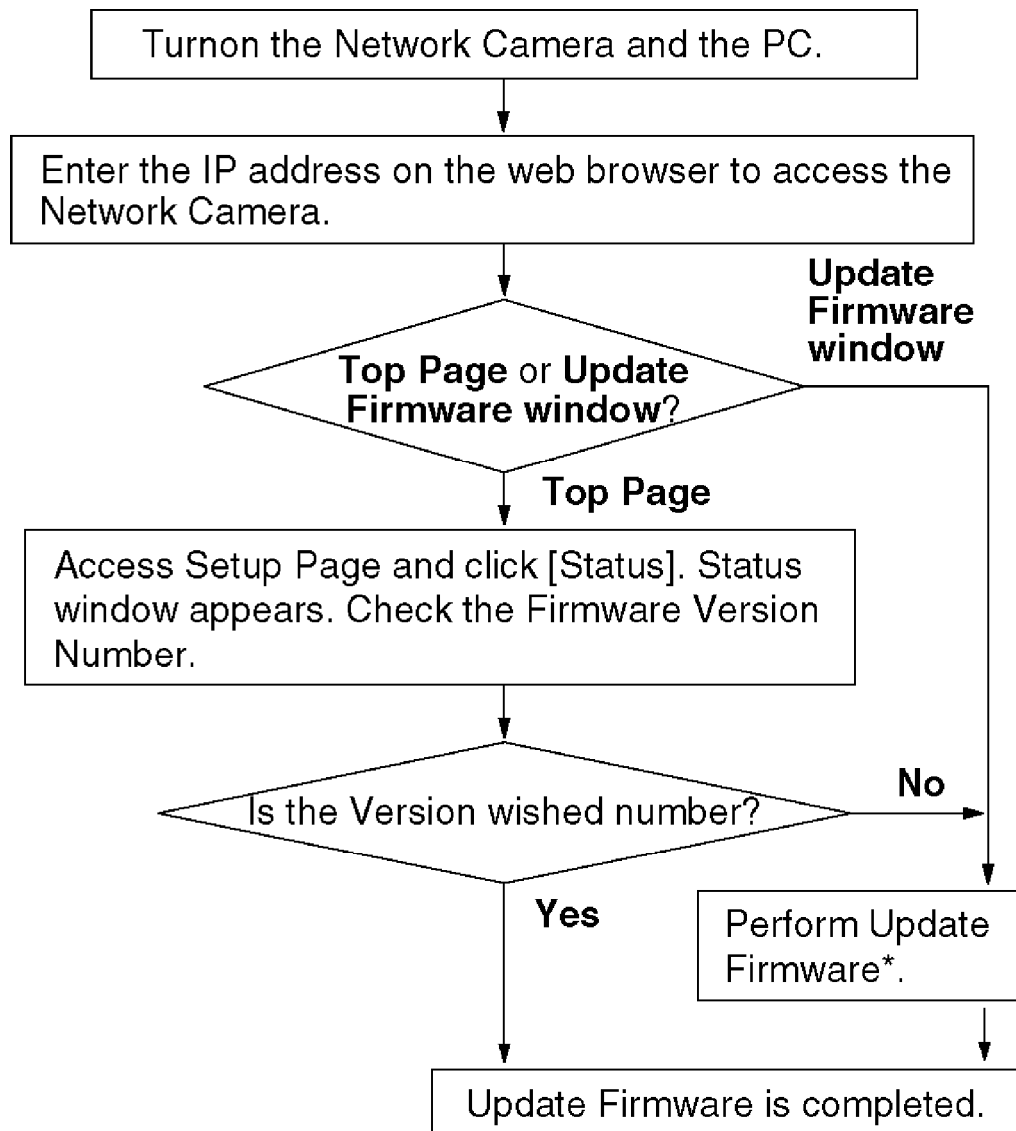
And the upgrade of the software for Camera is practiced to set CPU (IC902) on Video board to Boot mode, and to rewrite Flash ROM in CPU (IC102) by way of serial interface by CPU (IC101) on the Main board.

Control Signal \ Mode	Normal Mode	Boot Mode
Boot 1 (IC902#66)	L	H
Boot 2 (IC902#67)	H	L

11.10.2. Firmware Trouble Shouting

When update missed.

When Update Firmware is interrupted by power off, or for network troubles and other problems, follow the procedure below.



* Refer to Operating Instructions for the Update Firmware.

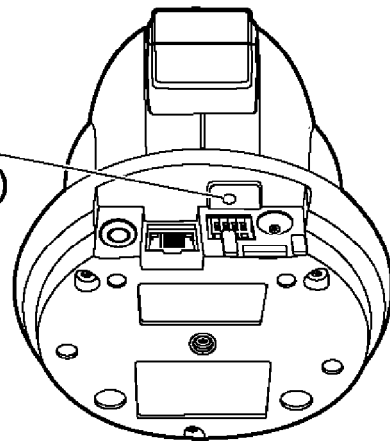
12. THE WAY OF THE INITIALIZE

12.1. NETWORK CAMERA RESET PROCEDURE-DEFAULT SETTINGS

If the user forgets the settings or passwords, the Network Camera can be easily reset to the default settings. FACTORY DEFAULT RESET button initializes all the parameters except Date and Time setting.

With power on, press the FACTORY DEFAULT RESET button for about one second. Indicator changes such as Orange blinking twice → Turning off about 15 seconds. Initializing takes about one minute. Pan/Tilt motors will set to the home position.

FACTORY DEFAULT RESET button
(Press the button with a pointed object)



Note:

When pressing the FACTORY DEFAULT RESET button, all buffered images are cleared.

12.2. RESET TO FACTORY DEFAULT

Reset to Factory Default window initializes all the parameters including the ID, Password, IP address and Subnet Mask except Date and Time setting to the factory default. Please reconfirm before doing the Reset to Factory Default operation.

1. Click [Reset to Factory Default] on Setup Page.

Reset to Factory Default

Would you like to reset to Factory Default? Reset to Factory Default operation takes up to 1 minute.

Caution:

- (1) Buffered images are erased when you execute this page.
- (2) Never turn off the power during the Reset to Factory Default.
- (3) Please refer to "Getting Started" to open this Network Camera after execute this page. Because setting condition will be changed.

Especially,

IP Address : Change to	192.168.0.253
Subnet Mask : Change to	255.255.255.0

2. Click [Execute].

- Indicator changes such as Orange blinking twice → Turning off about 15 seconds. Initializing takes about one minute.
- Click [Cancel] to quit. The window returns to the Setup Page.

Note:

- Do not turn off the power during the Reset to Factory Default. It may interrupt the Network Camera operation.
- IP address and Subnet Mask should be set newly after Resetting to Factory Default.
- FACTORY DEFAULT RESET button can also reset the Network Camera to the Factory Default. Please refer to Operating Instructions.
- Internal clock will not be erased, however, time mode will return to AM/PM mode and Auto adjustment will be disabled.
- If Reset to Factory Default is used, all user settings will be lost. You will have to reconfigure the entire Network Camera.

13. NETWORK CAMERA KX-HCM280 BLOCK DIAGRAM

14. CIRCUIT DESCRIPTION

14.1. MAIN UNIT (MAIN BOARD, I/O BOARD, TILT BOARD)

14.1.1. CPU Block

CPU (IC101)

Operating Power Supply: +3.3V (I/O) +1.8V (Inside)

Package: 208 pin QFP

Controls the whole system.

Receives a 16.67MHz G/A clock from the outside, multiplies it by 8 inside, and operates on a 133.36MHz clock.

The following are incorporated: Clock Pulse Generator (CPG), Memory Management Unit (MMU), 16KB-Cache, Interruption Controller (INTC), Real Time Clock (RTC), DMAC*4ch, SCC*3ch and others.

The FLASH (IC102), SDRAM (IC103), LAN Controller (IC501), JPEG Codec (IC701), and RTC (IC107) are accessed through the CPU bus.

The Camera CPU (IC902) on the Video board is connected with CPU (IC101) through the serial interface (RXD-232C/TXD-232C).

RESET (IC105, IC110)

Operating Power Supply: Reset voltage, IC105: 2.9V, IC110: 1.6V

Package: 4 pin SOP

Generate Reset signals in the CPU during about 200 ms after the power turns on.

FLASH MEMORY (IC102)

Operating Power Supply: +3.3V

Package: 48 pin TSOP

Capacity: 16Mbit, Access Time: 90ns

Stores programs and MAC Addresses, which are read in by the CPU for operation.

Stores user set values also.

An upgrade from 10/100 BASE-Tx is possible.

SDRAM (IC103)

Operating Power Supply: +3.3V

Package: 54 pin TSOP

Capacity: 64Mbit

Stores the memory for CPU work and temporary saved images.

DEFAULT SW (SW101)

Pressing the default SW can return the set point of the network camera to factory-settings.

14.1.2. LAN Block**LAN CONTROLLER (IC501)**

Operating Power Supply: +3.3V

Package: 128 pin TQFP

Operating Clock: 25MHz (X501)

Automatic switching (auto negotiation) of 10BASE-T/100BASE-TX Built-in transmit-receive 8KB FIFO

The LAN interface consists of IC501 and RJ-45 module with a built-in transformer (CN5).

LAN PACKET SIGNAL FLOW

When transmitted

1. While the Camera is sending data to the network, the CPU (IC101) reads the data from the SDRAM (IC103).
2. The data is present on the data port of the LAN Controller (IC501).
3. The LAN Controller writes the data, which was written on the data port, into the Transmission Buffer, using the built-in Remote DMA.
4. Repeat the steps above from 1 to 3 for one packet.
5. Receives a transmission command from the CPU, and transfers the data from the Transmission Buffer to the FIFO, using Local DMA.

Receiving Operation

1. After receiving one packet of data, the LAN controller informs the CPU of it.
2. The CPU checks if the packet is normal.
3. If normal, the CPU transfers the data on the Receive Buffer to the data port, using the Remote DMA. If abnormal (error), the CPU abandons the packet.
4. The CPU reads receive data out of the data port.

14.1.3. Video Decoder & JPEG Block

VIDEO DECODER (IC601)

Operating Power Supply: +3.3V

Package: 100 pin QFP

Operating Clock: 24.54MHz

The video decoder (IC601) converts the analog video signal output from the camera unit into the digital signal in real time. It converts each analog signal of Y/C into 8 bit *2 digital signal of Y/UV.

JPEG CODEC (IC701)

Operating Power Supply: +3.3V

Package: 100 pin QFP

Operating Clock: 16.67MHz

Captures digital image data (saves the data in the IC702 DRAM for JPEG), and compresses it in JPEG format. The compressed data is stored in the SDRAM (IC103) by the DMAC incorporated in the CPU.

DRAM (IC702)

Operating Power Supply: +3.3V

Package: 44 pin TSOP

Capacity: 4Mbit

Access Time: 60ns

Used for capturing and compressing JPEG images.

Image Data Flow

1. The analog Y/C signal is sent to the video decoder from the camera unit.
2. The above data is converted into 8 bit Y data and 8 bit UV data with the video decoder (IC601), and then sent to VIDEO-I/F of JPEG

(IC701).

3. JPEG (IC701) synchronizes the data to the falling edge of n VSYNC (start of 1 screen), and then accumulates the data from VIDEO-I/F in the Image buffer of DRAM (IC702).
4. The image data accumulated in the Image buffer of DRAM (IC702) is read out to JPEG CODEC, and then JPEG-compressed by pixel.
5. The compressed data is stored in the CODE buffer. The data is read out of the FIFO, and written into SDRAM (IC103) by DMAC in the CPU.

14.1.4. Power Block (Main Board, I/O Board, Tilt Board)

The Power Block generates the power used in each part.

14.1.5. I/O Terminal Block

I/O Terminal (CN11) (On the I/O Board)

Terminal Structure: Power Supply (12V DC 100mA), GND, Input (Connect Point), Output (Open Collector)

The input and output terminals are controlled by the CPU (IC101) port via Q11 and Q10.

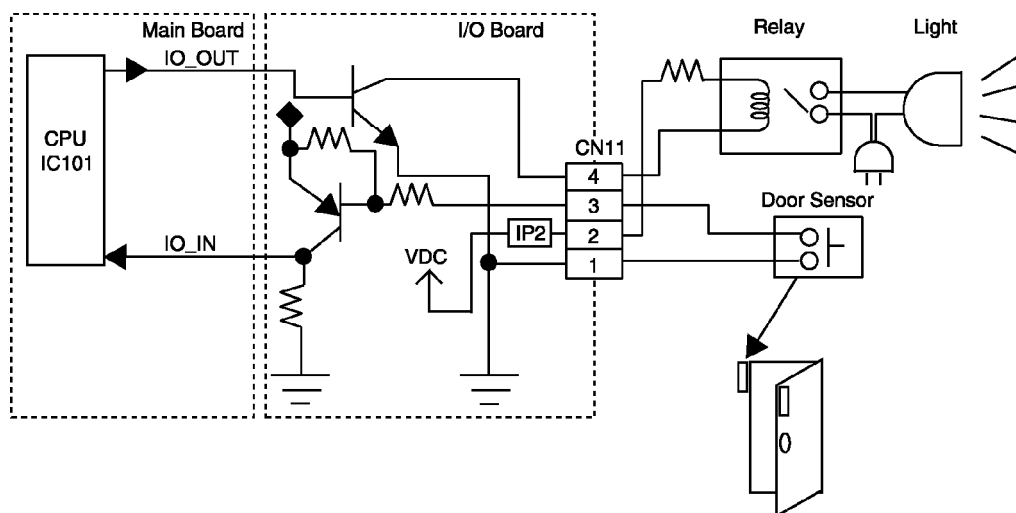
14.1.6. Interfacing to the External I/O

The Alarm mode in the Image Transfer feature requires the external sensors/devices to be connected to the External Sensor Input of the External I/O. Certain features of this Network Camera can be activated by an external sensor that senses physical changes in the area the Network Camera is monitoring. These changes can include motion detection, or a physical change in the monitored area. The external sensor can also be a door switch or an infrared motion detector. These devices are customer provided, and are available from dealers who carry surveillance and security products. Electrically, they must be able to provide a momentary contact closure.

Explanation of External I/O

Pin	Function
1	GND
2	DC Power Output Terminal -10.5-13.5V DC -Maximum of 100 mA load drive is possible.
3	External Sensor Input -External Sensor Input receives the signal produced by the alarm sensors, e.g., door sensor, infrared ray sensor. Those signals can activate Image Transfer in the Alarm mode feature on Operating Instructions. -Please use it by opening or GND short-circuit.
4	External Device Control Output -External Device Control Output sends the electric current to activate the external devices, e.g., light, buzzer. -External Output Control window can set the External Device Control Output. -It is an open collector circuit, and the maximum drawing-in current is 100 mA. Prevent the maximum voltage from exceeding DC Power Output voltage of pin 2.

Circuit Diagram Example



IP2: Polyswitch

IP2 protects the camera against the short circuit between 1pin (GND) and 2pin (DC power out) of CN2.

Caution:

- The External I/O is not capable of connecting directly to devices that require amounts of current. In some cases, a custom interface circuit (Customer Provided) may have to be used. Serious damage to the network camera may result if a device is connected to the External I/O that exceeds its electrical capability.
- The Low voltage/current circuits and High voltage/current circuits are in the network camera circuit. The qualified electrician should

do the wiring not by yourself. incorrect wiring could damage the network camera. You could receive the fatal electric shock.

- External I/O (Input/Output) are independent. External Device Control Output is controlled only by External Output Control window on Operating Instructions.

14.1.7. RTC Block With Battery

RTC (IC107) (On the Main Board)

Operating power: +3.3V Battery backup 3V

Package: 18pin SOP

Clock frequency is 32kHz clock. Contents of the clock are battery-backed up even when the power is OFF.

LITHIUM BATTERY (BAT1) (On the I/O Board)

Output Voltage: +3V

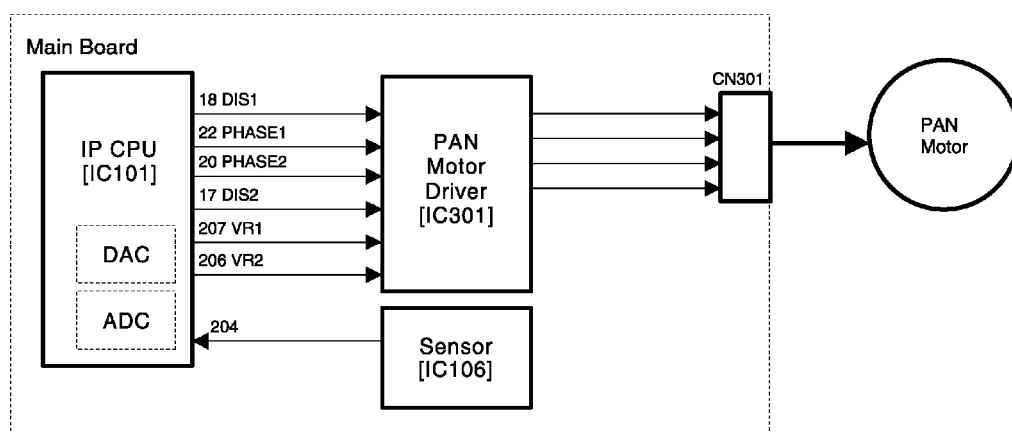
Capacity: 48mAh

Power supply for backing up the RTC data

14.1.8. PAN Control Block

A PAN motor is performed when IP CPU mounted on the Main board controls the motor driver IC on this substrate (IC301).

moreover, the absolute position of the PAN operation is detected by the photo sensor (IC106) mounted on this board is realized using the photograph sensor (IC106) mounted on this substrate. The detection signal of a photo sensor is detected by the AD converter built in IP CPU (IC101).



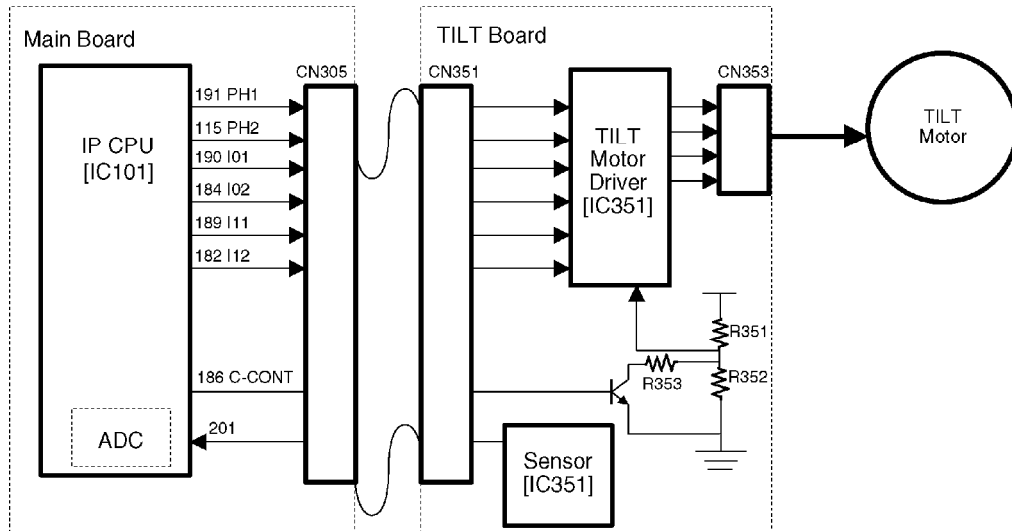
14.1.9. TILT Control Block

A TILT motor is performed when IP CPU mounted on the Main board controls the motor driver IC on a TILT board (IC352).

moreover, the absolute position of the PAN operation is detected by the photo sensor (IC106)

mounted on this board is realized using the photo sensor (IC351) mounted on this substrate. The detection signal of a photo sensor is detected by the AD converter built in IP CPU (IC101). At the time of TILT operation, phase current from a motor driver is enlarged, and while not operating, it is controlled to lessen (C-CONT).

(At the time of operation: C-CONT='L', At the time of stop: C-CONT='H')



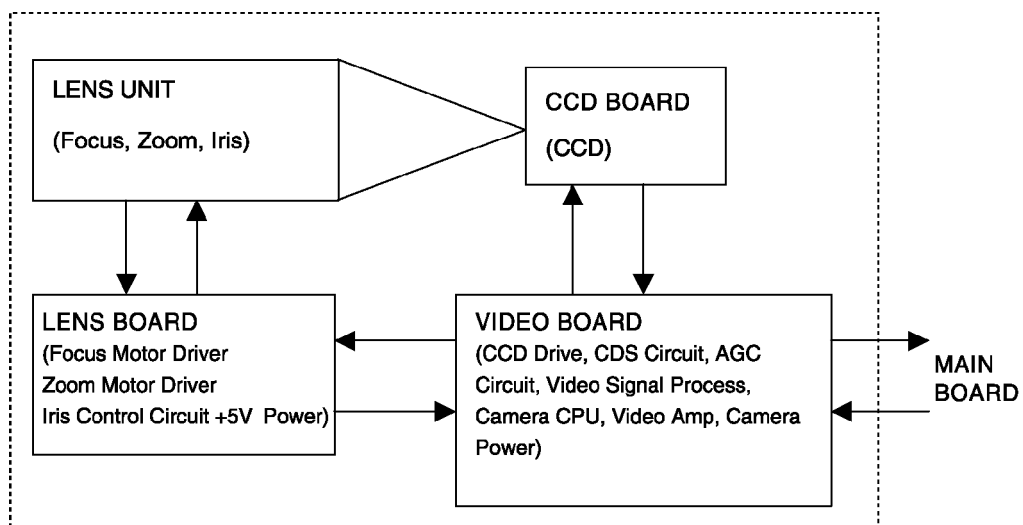
14.1.10. Default SW (On the Main Board)

DEFAULT SW (SW101)

Pressing the Default SW enables you to restore the factory-shipped settings of the network camera.

14.2. TILT BLOCK ASSY (CAMERA UNIT)

Camera Unit is composed of the lens unit, CCD board, VIDEO board and LENS board. It has functions which are video signal imaging/processing/output and lens control (Iris, Focus, Zoom).



14.2.1. CCD Board

Function

Photoelectric transfer by CCD for an imaged object

- CCD (IC1101)

Effective pixels: 768 x 494

Power-supply voltages: 12V, -5V

Image size: opposite angle 4.5 mm (1/4 SIZE)

CCD is driven by horizontal drive signal (H1, H2, RG) and vertical drive signal (V1~V4) that are output from a VIDEO board. The object focused by lens unit are converted to electronic signal. This electronics image signal is read by drive signals and output to IC1001 (7pin) → Q1101.

14.2.2. Video Board

Function

CCD output signal process and analog Y/C/Composite VIDEO signal output

Zoom, Focus, Iris in LENS UNIT and the entire signal process control

14.2.2.1. CPU Block

- CAMERA CPU (IC902)

Power-supply voltages: +3.3V, +5V (for A/D, D/A)

Package: 100pin QFP

Clock frequency: 12.288MHz (X901)

Total control of Camera Unit: lens control (Focus, Zoom, Iris), setting/control for Video DSP (IC803), setting/control for CDS& AGC (IC801), drive signal generation for CCD (IC1001)

Within Flash Rom stored Firmware for Camera Unit operation.

The communication with MAIN CPU (IC101) on MAIN board is established by the serial signals (RXD_232C, TXD_232C) via CN902. Also, the communication with CDS&AGC (IC801) and Video DSP (IC803) is established by the serial signals (CS_CDS, SDI_DSP, SDCLK_DSP, SDO_DSP, SLD_DSP). At the time of CPU (IC902) program upgrade, it is set to the upgrade mode by BOOT1 and BOOT2 signal in MAIN CPU (IC101), and the data is transferred via the serial signals (RXD_232C, TXD_232C) and written.

The timing synchronization with Video DSP (IC803) is performed

by FV_DSP, EP1_DSP and EP2_DSP. The lens control is performed by signals including PWM connected to the lens board via CN904.

14.2.2.2. Video Signal Process Block

- CDS (IC801)

Power-supply voltages: 3.3V

Package: 36pin QFP

Performs CDS (Correlate Double Sampling) process for CCD output signal from CCD board, AGC (Auto Gain Control) process and A/D conversion (10bit)

CCD output signal is sampled with SP1 and SP2 signal to reduce noise in CDS circuit. Then, after being adjusted to the specified level in accordance with the serial signal (CS_CDS, SDI_DSP, SDCLK_DSP) instruction from CAMERA CPU (IC902) in GCA circuit, it is converted to 10bit, the digital signal with the sampling frequency: 14,31818 MHz of ADCLK input signal by A/D converter. This output signal is adjusted in order that OB (Optical Black) on CCD output signal shall be standard level by OBP signal.

- VIDEO DSP (IC803)

Power-supply voltages: +3.3V

Package: 120pin QFP

Clock frequency: 28.636MHz (X801)

Processes CDS IC (IC801) output signal and outputs Y signal and C signal. Outputs CCD drive signal.

Writing each setting to this IC and reading of data is performed by the serial signal (CS_CDS, SDI_DSP, SDCLK_DSP, SDO_DSP, SLD_DSP) in CAMERA CPU.

<Video signal process>

The signal input from CDS IC (IC801) is composed of luminance signal process and color signal process.

- Luminance signal process

1. Horizontal/Vertical edge enhance
2. Gamma correction for grey-level
3. Adjusts level correctly
4. D/A converts for output

- Color signal process

1. RGB matrix to convert to RGB signal
2. White Balance by CAMERA CPU instruction

3. Gamma correction for R/G/B signal respectively
4. Color-Difference matrix to convert to the color-difference signal (R-Y, B-Y signal) and to adjust chroma/phase
5. Modulation process in accordance with NTSC standard
6. D/A converts for output

Additionally, the detection process for AE (Auto Exposure), AF (Auto Focus) and AWB (Auto White Balance) is made for automatic control. The detection data is read by the serial signal in CAMERA CPU.

<CCD drive signal and Timing signal generation>

Outputs CCD drive signal [horizontal (H1, H2, RG) and vertical (V1~V4)] and Timing signal [Composite Synchronization signal, CAMERA CPU interrupt timing signal (VD, EP1, EP2) and signal for CDS IC (SP1, SP2, ADCLK, OBP)]. The signal timing is set by the serial signal in CAMERA CPU.

- V Driver (IC802)

Power-supply voltages: -5V, +3.3V, +12V

Package: 20pin SOP

Generates CCD vertical drive signal from CCD vertical drive timing signal in VIDEO DSP (IC803).

CCD vertical drive timing signal with +3.3Vp-p is converted to binary (-5V~0V) and to ternary (-5V~0V~+12V), and is output as V1~V4 signal.

- VIDEO AMP (IC804)

Power-supply voltages: +3.3V

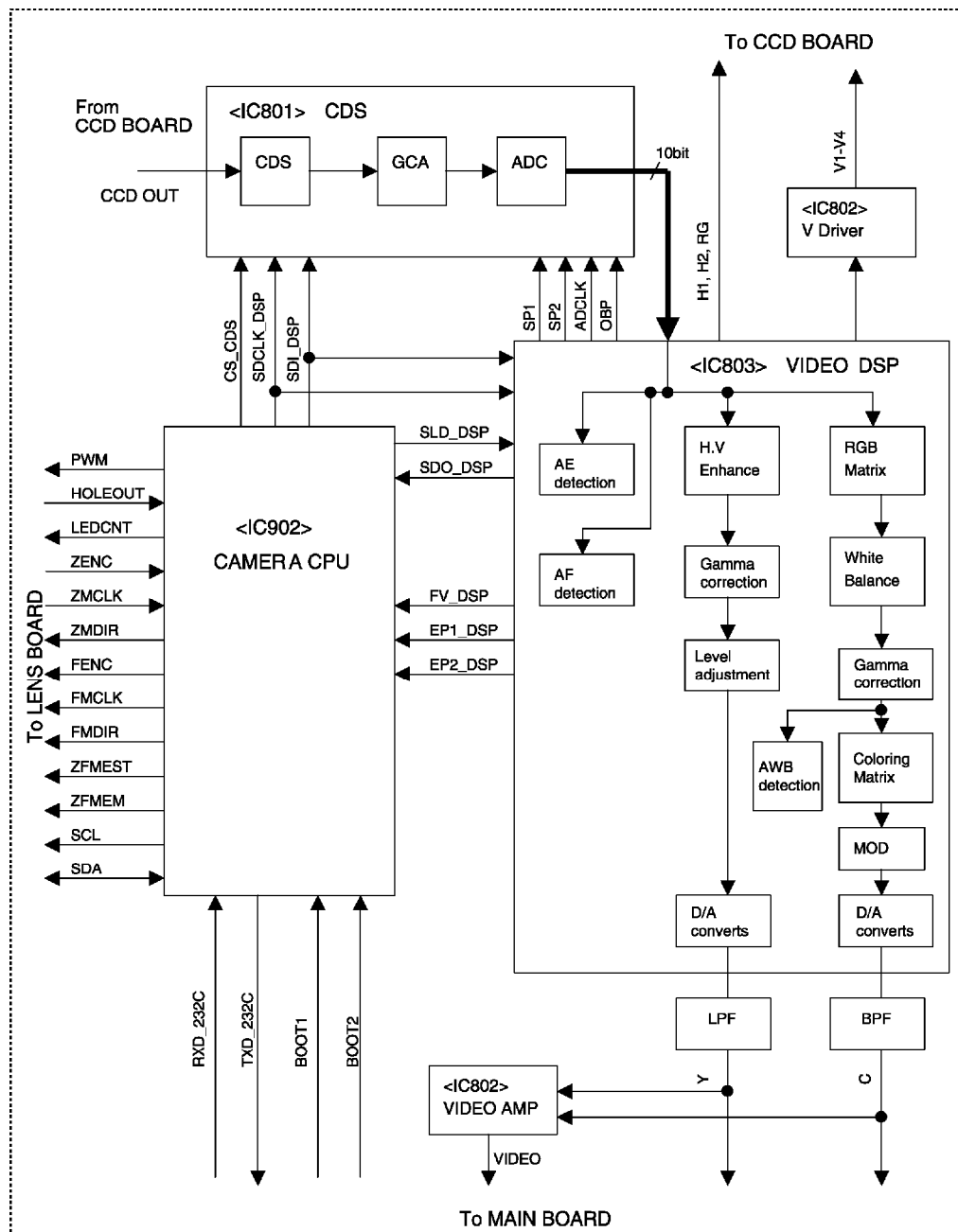
Package: 8pin SOP

Y signal and C signal that are output from VIDEO DSP (IC803) will input via the following route, respectively.

Y signal: IC803 46pin → LPF (L808) → Q801 → Q803

C signal: IC803 42pin → BPF (L809) → Q802 → Q804

Each signal is combined to take a form of composite VIDEO signal and amplified +12dB, and they are output from 3pin via 75 Ω driver.

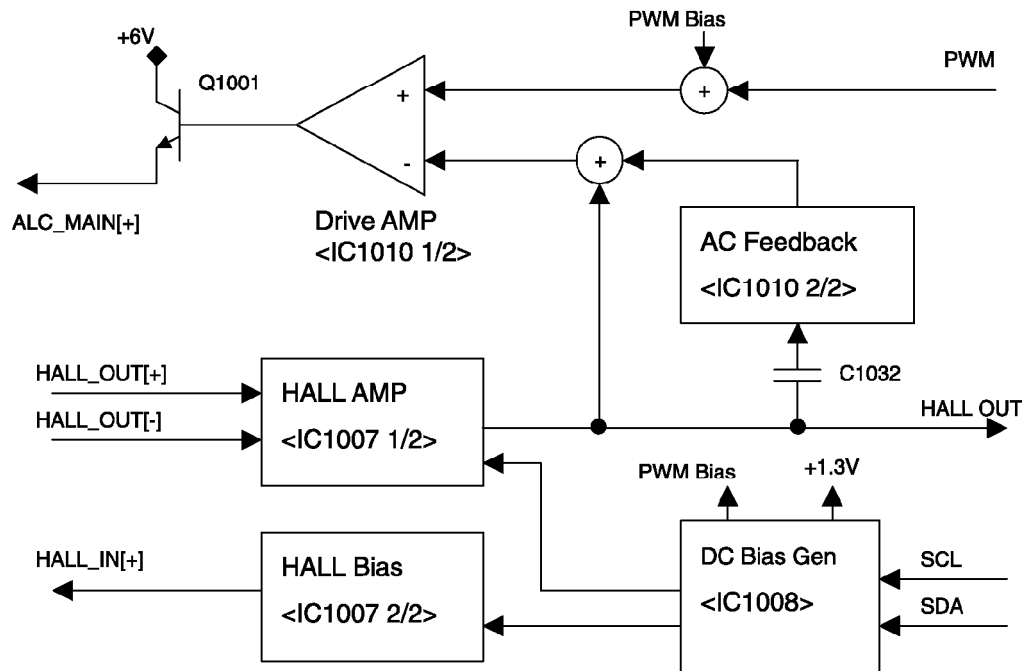


14.2.3. Lens Board

Function

Zoom, Focus and Iris in LENS UNIT driving.

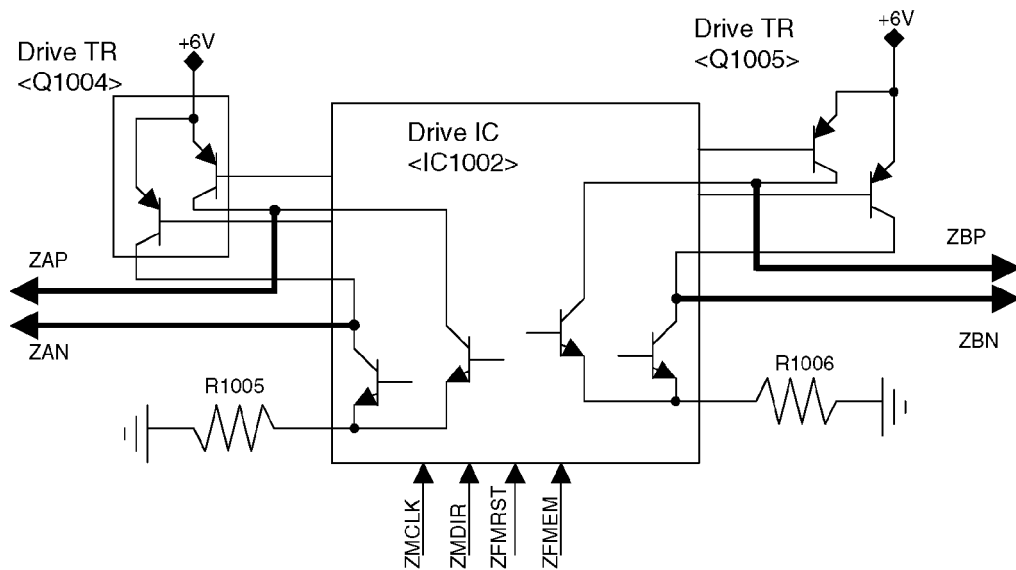
14.2.3.1. IRIS Drive Block



PWM signal from MAIN board is compared with HALL OUT signal in Drive AMP (IC1010), and drives Iris in LENS UNIT as ALC_MAIN [+] signal so that the difference between PWM and HALL OUT may be zero. HALL OUT signal is produced by IC1007 from HALL_OUT [+] / HALL_OUT [-] signal, which are produced depending on the Iris position in LENS UNIT, and generates voltage as large as Iris opens. The HALL_OUT signal is transferred to MAIN board as the information for Iris position and also, its AC component is transferred through C1032 to IC1010 for stabilization of Iris drive, and then a stabilized signal is produced. This stabilized signal is added to HALL OUT signal.

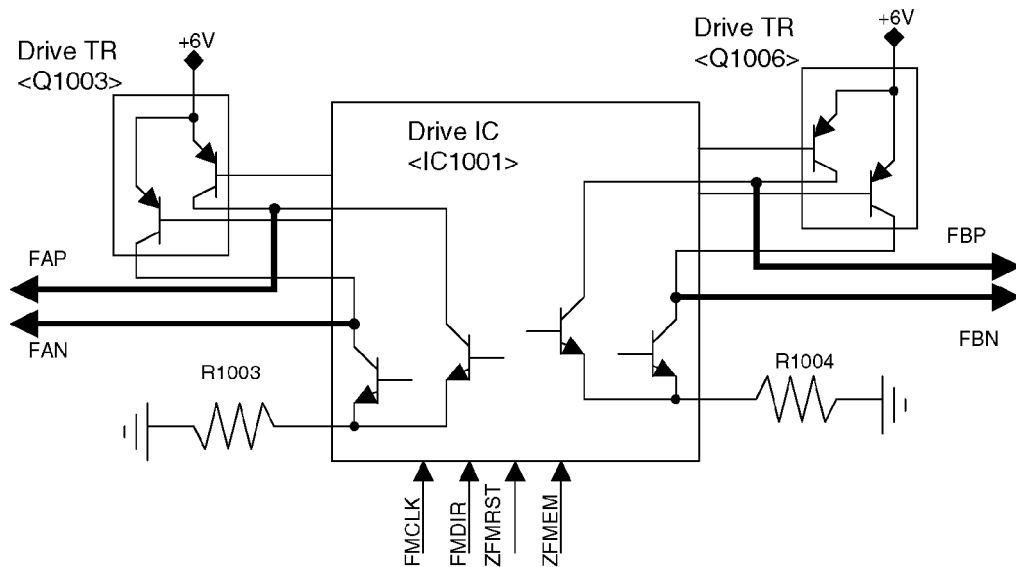
In DC bias Generator (IC1008), DC voltage is generated by I2CBUS signal (SCL, SDA) from MAIN board, and the voltage will apply to PWM signal bias voltage (4pin output), OP amp bias (+1.3V: 3pin output), HALL bias circuit (IC1007) (1pin output) for HALL device bias voltage generation in LENS UNIT and HALL OUT signal DC level decision (2pin output).

14.2.3.2. Zoom Motor Drive Block



The ZOOM motor, which type is a stepping motor, is driven with the motor driver (IC1002). The drive system is Constant Current Drive 2W1-2 Phase Excitation Micro Step Drive. It works by 1 step to the direction set by ZMDIR signal, per 1 clock of ZMCLK signal given to IC1002. The motor current flows as below. In phase A: 6V power → Q1004 6pin → Q1004 1pin → ZAP signal → motor phase A → ZAN signal → IC1002 14pin → IC1002 19pin → R1005 → GND, or, 6V power → Q1004 3pin → Q1004 4pin → ZAN signal → motor phase A → ZAP signal → IC1002 16pin → IC1002 19pin → R1005 → GND In phase B: Q1005 3pin → Q1005 4pin → ZBP signal → motor phase B → ZBN signal → IC1002 11pin → IC1002 6pin → R1006 → GND, or, 6V power → Q1005 6pin → Q1005 1pin → ZBN signal → motor phase B → ZBP signal → IC1002 9pin → IC1002 6pin → R1006 → GND The motor driving direction is determined by ZMDIR signal.

14.2.3.3. Focus Motor Drive Block



FOCUS motor, which type is a stepping motor as ZOOM motor, and which drive circuit is also same type as ZOOM motor, is driven with the motor driver (IC1001). The drive system is Constant

Current Drive 2W1-2 Phase Excitation Micro Step Drive. It works by 1 step to the direction set by FMDIR signal, per 1 clock of FMCLK signal given to IC1001. The motor current flows as below. In phase A: 6V power → Q1003 6pin → Q1003 1pin → FAP signal → motor phase A → FAN signal → IC1001 14pin → IC1001 19pin → R1003 → GND, or, 6V power → Q1003 3pin → Q1003 4pin → FAN signal → motor phase A → FAP signal → IC1001 16pin → IC1001 19pin → R1003 → GND In phase B: Q1006 3pin → Q1006 4pin → FBP signal → motor phase B → FBN signal → IC1001 11pin → IC1001 6pin → R1004 → GND, or, 6V power → Q1006 6pin → Q1006 1pin → FBN signal → motor phase B → FBP signal → IC1001 9pin → IC1001 6pin → R1004 → GND The motor driving direction is determined by FMDIR signal.

14.2.3.4. EEPROM Block

- EEPROM (IC1009)

Power-supply voltages: 3.3V

Package: 8pin SOP

Memory Capacity: 2K x 8bit

It shall be READ/WRITE by I2CBUS signal (SCL, SDA). Memorizes the values of LENS adjust, VIDEO adjust and VIDEO DSP install.

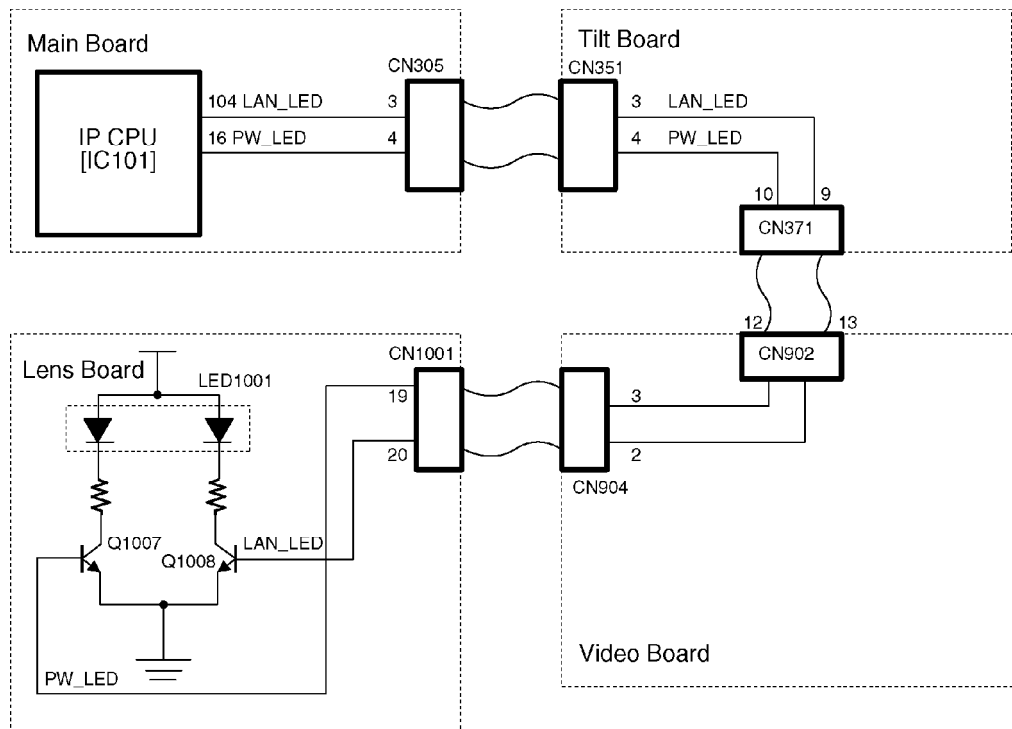
When the power is ON or camera unit is reset, it is READ and installed to each system.

14.2.3.5. LED Block

A line crack and a control signal relay a Tilt board and a Video board from IP CPU by which control of LED was mounted on the Main board, and it is inputted into the LED control circuit mounted in the Lens board.

(As for LED, the 3 color LED is used.)

LAN_LED	PW_LED	LED COLOR
H	H	Orange
H	L	Green
L	H	Red
L	L	OFF the light



14.2.4. Power Block (Tilt Block Ass'y)

The Power Block generates the power used in each part.

15. IC DATA

15.1. IC101 (CPU)

208	AVSS9	156	EXTAL
207	PTL7	155	XTAL
206	PTL6	154	VCC4
205	AVCC	153	VSS5
204	PTL5	152	VSS4
203	PTL4	151	AUDCK
202	PTL3	150	Vcc-PLL2
201	PTL2	149	CAP2
200	PTL1	148	Vss-PLL2
199	PTL0	147	Vss-PLL1
198	AVSS1	146	CAP1
197	MD5	145	Vcc-PLL1
196	MD4	144	MD0
195	MD3	143	PTF0
194	CA	142	PTF1
193	nRESETP	141	PTF2
192	nDREQ1	140	PTF3
191	nDREQ0	139	TCF
190	PTD0	138	TDI
189	PTD1	137	TMS
188	PTC0	136	nTRST
187	PTC1	135	AUDATA0
186	PTC2	134	VCC3
185	PTC3	133	AUDATA1
184	PTD2	132	VSS3
183	PTD3	131	AUDATA2
182	VCCQ11	130	AUDATA3
181	VSSQ11	129	PTG4
180	PTC4	128	nASEBRKAK
179	PTC5	127	nASEMD0
178	PTC6	126	PTG6
177	PTC7	125	PTH5
176	nCTS2	124	nRESETM
175	VCC6	123	nWAIT
174	RXD2	122	nBREQ
173	VSS6	121	nBACK
172	RXD1	120	TDO
171	RXD0	119	PTE1
170	nRTS2	118	nRAS3U
169	TXD2	117	PTE3
168	TXD1	116	PTE6
167	TXD0	115	nDACK1
166	TXD1	114	nDACK0
165	TXD0	113	PTJ5
164	VCCQ8	112	PTJ4
163	CKIO	111	VCCQ8
162	VSSQ9	110	nCASLH
161	TCLK	109	VSSQ8
160	nIRQOUT	108	nCASL1
159	PTJ7	107	PTJ1
158	PTJ6	106	nRAS3L
157		105	PTK5
156			
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INDEX MARK

SH7709
FP-208C
(Top Surface View)

CPU PIN LIST

Pin No.	Pin Name	I/O	Description
1	MD1	I	Clock Mode Setting Terminal (GND Connection)
2	MD2	I	Clock Mode Setting Terminal (GND Connection)
3	VCC-RTC	-	RTC Power Supply (+1.8V)
4	XTAL2	O	Oscillator out
5	EXTAL2	I	External Clock Terminal (32.768kHz)
6	VSS-TRC	-	RTC Power Supply (GND)
7	NMI	I	Non-mask able Interrupt Request (External Pull-Up)
8	IRQ0	I	Interrupt Request from LAN Controller
9	IRQ1	I	Interrupt Request from JPEG CODEC
10	IRQ2	I	Censor Input Port
11	IRQ3	I	Interrupt Request from ADPCM (Unassigned External pull-up)
12	IRQ4	I	AC STOP Interrupt Request
13	PTB7	O	Unassigned (LOW Output)
14	PTB6	O	Unassigned (LOW Output)
15	PTB5	O	I/O OUT
16	PTB4	O	POWER-LED Control
17	PTB3	O	Pan Motor Control [DIS2]
18	PTB2	O	Pan Motor Control [DIS1]
19	VSSQ	-	Input/Output Power Supply (GND)
20	PTB1	O	Pan Motor Control [PHASE2]
21	VCCQ	-	Input/Output Power Supply (+3.3V)
22	PTB0	O	Pan Motor Control [PHASE1]
23	PTA7	I	Default SW Input (Low Active)
24	PTA6	O	POWER DOWN (High Active)
25	PTA5	O	Wireless board Reset
26	PTA4	O	JPEG Power-Down (Low Active)
27	VSS	-	Power Supply (GND)
28	PTA3	O	PTZ Camera RESET (Low Active)
29	VCC	-	Power Supply (+1.8V)
30	PTA2	O	Video DECODER RESET (Low Output)
31	PTA1	O	JPEG RESET (Low Active)
32	PTA0	O	LAN RESET (High Active)
33	VSSQ	-	Input/Output Power Supply (GND)
34	D15	I/O	Data Bus
35	VCCQ	-	Input/Output Power Supply (+3.3V)
36	D14	I/O	Data Bus
37	D13	I/O	Data Bus
38	D12	I/O	Data Bus
39	D11	I/O	Data Bus
40	D10	I/O	Data Bus
41	D9	I/O	Data Bus
42	D8	I/O	Data Bus

Pin No.	Pin Name	I/O	Description
43	D7	I/O	Data Bus
44	D6	I/O	Data Bus
45	VSSQ	-	Input/Output Power Supply (GND)
46	D5	I/O	Data Bus
47	VCCQ	-	Input/Output Power Supply (+3.3V)
48	D4	I/O	Data Bus
49	D3	I/O	Data Bus
50	D2	I/O	Data Bus
51	D1	I/O	Data Bus
52	D0	I/O	Data Bus
53	A0	O	Address Bus
54	A1	O	Address Bus
55	A2	O	Address Bus
56	A3	O	Address Bus
57	VSSQ	-	Input/Output Power Supply (GND)
58	A4	O	Address Bus
59	VCCQ	-	Input/Output Power Supply (+3.3V)
60	A5	O	Address Bus
61	A6	O	Address Bus
62	A7	O	Address Bus
63	A8	O	Address Bus
64	A9	O	Address Bus
65	A10	O	Address Bus
66	A11	O	Address Bus
67	A12	O	Address Bus
68	A13	O	Address Bus
69	VSSQ	-	Input/Output Power Supply (GND)
70	A14	O	Address Bus
71	VCCQ	-	Input/Output Power Supply (+3.3V)
72	A15	O	Address Bus
73	A16	O	Address Bus
74	A17	O	Address Bus
75	A18	O	Address Bus
76	A19	O	Address Bus
77	A20	O	Address Bus
78	A21	O	Address Bus (Unassigned)
79	VSS	-	Power Supply (GND)
80	A22	O	Address Bus (Unassigned)
81	VCC	-	Power Supply (1.8V)
82	A23	O	Address Bus (Unassigned)
83	VSSQ	-	Input/Output Power Supply (GND)
84	A24	O	Address Bus (Unassigned)

Pin No.	Pin Name	I/O	Description
85	VCCQ	-	Input/Output Power Supply (+3.3V)
86	A25	O	Address Bus (Unassigned)
87	PTK4	O	Unassigned (LOW Output)
88	nRD	O	Read Signal (Low Active)
89	nWE0	O	Write Signal (Low Active)
90	nWE1	O	Write Signal (Low Active)
91	nCIORD	O	IO Read Signal (Unassigned)
92	nCIOWR	O	IO Write Signal (Unassigned)
93	RD/nWR	O	Read (High Active)/ Write (Low Active)
94	nAUDSYNC	I	Unassigned (Internal Pull-Up)
95	VSSQ	-	Input/Output Power Supply (GND)
96	nCS0	O	Flash Chip Select (Low Active)
97	VCCQ	-	Input/Output Power Supply (+3.3V)
98	nCS2	O	Chip Select (Low Active) Unassigned
99	nCS3	O	SDRAM Chip Select (Low Active)
100	nCS4	O	Unassigned
101	nCS5	O	Unassigned
102	nCS6	O	LAN and JPEG Chip Select (Low Active)
103	nCE2A	O	Unassigned
104	nCE2B	O	LAN_LED control
105	CKE5	O	CLK Enable
106	nRAS3L	O	RAS (Low Active)
107	PTJ1	O	Unassigned (LOW Output)
108	nCASLL	O	CAS (Low Active)
109	VSSQ	-	Input/Output Power Supply (GND)
110	nCASLH	O	Unassigned
111	VCCQ	-	Input/Output Power Supply (+3.3V)
112	PTJ4	O	Unassigned (LOW Output ADPCM DATA IN)
113	PTJ5	O	Unassigned (LOW Output ADPCM EX CLK)
114	nDACK0	O	DMA Transfer ACK (Low Active)
115	nDACK1	O	Tilt Motor Control (PH2)
116	PTE6	O	Tilt Motor Control (PH1)
117	PTE3	O	Boot Control 2
118	nRAS3U	O	Unassigned
119	PTE1	O	Boot Control 1
120	TDO	I	Unassigned (Internal Pull-Up)
121	nBACK	O	Unassigned
122	nBREQ	I	Unassigned (External Pull-Up)
123	nWAIT	I	Hardware WAIT Request (Low Active)
124	nRESETM	I	Unassigned (External Pull-Up)
125	PTH5	I	Unassigned (External Pull-Down)
126	PTG7	I	Unassigned (External Pull-Up)

Pin No.	Pin Name	I/O	Description
127	nASEMD0	I	ASE MODE (External Pull-Up)
128	nASEBRKAK	I	Unassigned (Internal Pull-Up)
129	PTG4	I	Unassigned (ADPCM OF)
130	AUDATA3	I	Unassigned (Internal Pull-Up)
131	AUDATA2	I	Unassigned (Internal Pull-Up)
132	VSS	-	Power Supply (GND)
133	AUDATA1	I	Unassigned (Internal Pull-Up)
134	VCC	-	Power Supply (+1.8V)
135	AUDATA0	I	Unassigned (Internal Pull-Up)
136	nTRST	I	Unassigned (Internal Pull-Up)
137	TMS	I	Unassigned (Internal Pull-Up)
138	TDI	I	Unassigned (Internal Pull-Up)
139	TCK	I	Unassigned (Internal Pull-Up)
140	PTF3	I	IMREAD
141	PTF2	I	Unassigned (External Pull-Down)
142	PTF1	I	Unassigned (External Pull-Down)
143	PTF0	I	Unassigned (External Pull-Down)
144	MD0	I	Clock Mode Setting Terminal (External Pull-Up)
145	VCC-PLL	-	PLL1 Power Supply (+1.8V)
146	CAP1	-	PLL1 External Capacity Terminal
147	VSS-PLL1	-	PLL1 Power Supply (GND)
148	VSS-PLL2	-	PLL2 Power Supply (GND)
149	CAP2	-	PLL2 External Capacity Terminal
150	VCC-PLL2	-	PLL2 Power Supply (+1.8V)
151	AUDCK	I	Unassigned (Internal Pull-Up)
152	VSS	-	Power Supply (GND)
153	VSS	-	Power Supply (GND)
154	VCC	-	Power Supply (+1.8V)
155	XTAL	O	Clock Oscillator Terminal (Unassigned)
156	EXTAL	I	External Clock Terminal (16.67MHz)
157	PTJ6	O	Unassigned (LOW Output)
158	PTJ7	O	Unassigned (ADPCM DEN)
159	TCLK	I	Unassigned (External Pull-Down: ADPCM DATA out)
160	nIRQOUT	O	Unassigned
161	VSSQ	-	Input/Output Power Supply (GND)
162	CKIO	O	Unassigned
163	VCCQ	-	Input/Output Power Supply (+3.3V)
164	TXD0	O	Unassigned
165	SCK0	O	Unassigned
166	TXD1	O	Unassigned
167	SCK1	O	Unassigned (LOW Output)
168	TXD2	O	Unassigned

Pin No.	Pin Name	I/O	Description
169	SCK2	O	Unassigned (LOW Output)
170	nRTS32	O	Unassigned
171	RXD0	I	Unassigned (External Pull-Up)
172	RXD1	I	Unassigned (External Pull-Up)
173	VSS	-	Power Supply (GND)
174	RXD2	I	Unassigned (External Pull-Up)
175	VCC	-	Power Supply (+1.8V)
176	nCTS2	I	Unassigned (External Pull-Up)
177	PTC7	O	Unassigned
178	PTC6	I	Unassigned (External Pull-Up)
179	PTC5	I	Unassigned (External Pull-Up)
180	PTC4	O	Unassigned (LOW Output)
181	VSSQ	-	Input/Output Power Supply (GND)
182	PTD3	O	Tilt Motor Control (I12)
183	VCCQ	-	Input/Output Power Supply (+3.3V)
184	PTD2	O	Tilt Motor Control (I02)
185	PTC3	O	Unassigned (LOW Output)
186	PTC2	O	Tilt Motor Control (C-CONT)
187	PTC1	O	I2C on IIC-BUS SCL
188	PTC0	I/O	I2C on IIC-BUS SDA
189	PTD1	O	Tilt Motor Control (I11)
190	PTD0	O	Tilt Motor Control (I01)
191	nDREQ0	I	DMA Transfer Request (Low Active)
192	nDREQ1	I	Unassigned (External Pull-Down)
193	nRESET	I	CPU SYSTEM RESET SIGNAL
194	CA	I	Chip Active (External Pull-Up)
195	MD3	I	Area 0 BUS Width Setting (GND)
196	MD4	I	Area 0 BUS Width Setting (External Pull-Up)
197	MD5	I	Endian Setting (GND)
198	AVSS	-	Analog Power Supply (GND)
199	PTL0	I	(External Pull-Down)
200	PTL1	I	(External Pull-Down)
201	PTL2	I	Tilt Sensor In
202	PTL3	I	CD1
203	PTL4	I	CD2
204	PTL5	I	Pan Sensor In
205	AVCC	-	Analog Power Supply (+3.3V)
206	PTL6	I	Pan Motor Control (VR2)
207	PTL7	I	Pan Motor Control (VR1)
208	AVSS	-	Analog Power Supply (GND)

15.2. IC301, IC352

IC301, IC352

<u>1</u>	I02	VBB	<u>24</u>
<u>2</u>	I12	OUT2B	<u>23</u>
<u>3</u>	PHASE2	SENSE2	<u>22</u>
<u>4</u>	VREF2	E2	<u>21</u>
<u>5</u>	RC2	OUT2A	<u>20</u>
<u>6</u>	GND	GND	<u>19</u>
<u>7</u>	GND	GND	<u>18</u>
<u>8</u>	VCC	OUT1A	<u>17</u>
<u>9</u>	RC1	E1	<u>16</u>
<u>10</u>	VREF1	SENSE1	<u>15</u>
<u>11</u>	PHASE1	OUT1B	<u>14</u>
<u>12</u>	I11	I01	<u>13</u>

Pin No.	Pin Name	I/O	Description
1	I02	I	Motor Current Control02
2	I12	I	Motor Current Control12
3	PHASE2	I	Control Direction of Motor Current2
4	VREF2	I	Standard of Motor Current Control2
5	RC2	-	RC Connection for Oscillation2
6	GND	-	GND
7	GND	-	GND
8	VCC	-	Logic Power Supply
9	RC1	-	RC Connection for Oscillation1
10	VREF1	I	Standard of Motor Current Control1
11	PHASE1	I	Control Direction of Motor Current1
12	I11	I	Motor Current Control11
13	I01	I	Motor Current Control01
14	OUT1B	O	Motor Output1B
15	SENSE1	I	Motor Current attenuation detection1
16	E1	O	Motor Current detection1
17	OUT1A	O	Motor Output1A
18	GND	-	GND
19	GND	-	GND
20	OUT2A	O	Motor Output2A
21	E2	O	Motor Current detection2
22	SENSE2	I	Motor Current attenuation detection2
23	OUT2B	O	Motor Output2B
24	VBB	-	Motor Power Supply

15.3. IC501 (LAN)



Pin No.	Pin Name	Description
43	nROM	This pin is sampled at the end of RESET. For ISA operation this pin is left open end it is used as a ROM chip select output that goes active when nMEMR is low and the address bus contains a valid ROM address.
76-78, 80-87	AQ0-10	Input address lines 0 through 10.
89-97	A11-19	Input address lines 11 through 19.
2	AEN	ISA - Address enable input. Used as an address qualifier. Address decoding is only enabled when AEN is low.
74	nSBHE	ISA - Byte High Enable input. Asserted (low) by the system to indicate a data transfer on the upper data byte.
3	IOCHRDY	ISA - Output. Optionally used by the LAN91C93 to extend host cycles.
5-8, 10-13, 57-60, 62-65	D0-15	Bi-directional. 16 bit data bus used to access the LAN91C93 internal registers. The data bus has weak internal pullups. Supports direct connection to the system bus without external buffering.
15	RESET	Input. Active high Reset. This input is not considered active unless it is active for at least 100ns to filter narrow glitches.
68	INTR	ISA - Active high interrupt signal.
72	nIICS16	ISA - Active low output asserted in 16 bit mode when AEN is low and A4-A15 decode to the LAN91C93 address programmed into the high byte of the Base Address Register.
99	nIORD	ISA, - Input. Active low read strobe used to access the LAN91C93 IO space.
100	nIOWR	ISA, - Input. Active low write strobe used to access the LAN91C93 IO space.
1	nMEMR	ISA - Active low signal used by the host processor to read from the external ROM.
55	EESK	Output. 4 usec clock used to shift data in and out of a serial EEPROM.
54	EECS	Output. Serial EEPROM chip select.
52	EEDO	Output. Connected to the DI input of the serial EEPROM.
53	EEDI	Input. Connected to the DO output of the serial EEPROM.
46, 47	IOS0-1	Input. External switches can be connected to these lines to select between predefined EEPROM configurations. The values of these pins are readable.

Pin No.	Pin Name	Description
49	IOS2	Input. External switches can be connected to these lines to select between predefined EEPROM configurations. The values of these pins are readable.
20	nTXLED	Transmit output.
17	NBSELED	Board Select LED activated by accesses to I/O space (nIORD or nIOWR active with AEN low and valid address decode for ISA). The pulse is stretched beyond the access duration to make the LED visible.
19	nRXLED	Receive LED output.
18	nLNKLED	Link LED output.
51	ENEEP	Input. This active high input enables the EEPROM to be read or written by the LAN91C93. Internally pulled up. Must be connected to ground if no serial EEPROM is used.
44	XTAL1	An external parallel resonance 20MHz crystal should be connected across these pins. If an external clock source is used, it should be connected to this pin (XTAL1) and XTAL2 should be left open.
45	XTAL2	An external parallel resonance 20MHz crystal should be connected across these pins. If an external clock source is used, it should be connected to XTAL1 and this pin (XTAL2) should be left open.
33, 32	RECP/RECN	AUI receive differential inputs.
27, 26	TXP TXN	TXP and TXN are the AUI transmit differential outputs. They must be externally pulled up using 150 ohm resistors.
31, 30	COLP COLN	AUI collision differential inputs. A collision is indicated by a 10MHz signal at this input pair.
35, 34	TPERXP TPERXN	10BASE-T receive differential inputs.
25, 23	TPERXP TPERXN	INTERNAL ENDEC - 10BASE-T transmit differential outputs.
22, 24	TPERXDP TPERXDN	10BASE-T delayed transmit differential outputs. Used in combination with TPETXP and TPETXN to generate the 10BASE-T transmit pre-distortion.
39	RBIAS	A 22kohm 1% resistor should be connected between this pin and analog ground.
61, 70, 98, 9, 48, 88, 41	VDD	+5.0V power supply pins or 3.3V power supply pins

Pin No.	Pin Name	Description
21,29,40	AVDD	+5.0V analog power supply pins or 3.3V power supply pins
50, 56, 71, 7, 94,14, 42, 66, 16	VSS	Ground pins.
28, 36, 37	AVSS	Analog ground pins.
75, 73, 69,67, 38	NC	No-Connected pins

15.3.2. Buffer Symbols

O4	Output buffer with 2mA source and 4mA sink.
I/O4	Output buffer with 2mA source and 4mA sink.
O162	Output buffer with 2mA source and 16mA sink.
O24	Output buffer with 12mA source and 24mA sink.
OD16	Output buffer with 16mA sink.
OD24	Output buffer with 24mA sink.
I/O24	Bi-directional buffer with 1 2mA source and 24mA sink.
I	Input buffer with TTL levels.
IS	Input buffer with Schmidt Trigger Hysteresis.
Iclk	Clock input buffer.
**	Signal is 5.0V input tolerant when VCC=3.3V

Note:

When the device is designed at VCC=3.3V, the buffer symbols are not consistent with there associated drive current strengths. Please refer to the DC Electrical Section for additional details. DC levels and conditions defined in the DC Electrical Characteristics section.

15.4. IC601

1	DAV _{DD}	DAGND	100
2	VRT2	INS [0]	99
3	VIN6	INS [1]	98
4	VIN5	INS [2]	97
5	AV _{DD}	GAINS [0]	96
6	AGND	GAINS [1]	95
7	ADIN2	GAINS [2]	94
8	AMPOUT2	DV _{DD}	93
9	CLPOUT2	DGND	92
10	VRB2	M [0]	91
11	AGND	M [1]	90
12	AGND	M [2]	89
13	VRB1	M [3]	88
14	CLPOUT1	M [4]	87
15	AMPOUT1	M [5]	86
16	ADIN1	M [6]	85
17	VRCL1	M [7]	84
18	AGND	STATUS1	83
19	AV _{DD}	STATUS2	82
20	VIN4	STATUS3	81
21	VIN3	CLKX2	80
22	VIN2	DV _{DD}	79
23	VIN1	DGND	78
24	VRT1	CLKX2O	77
25	DAV _{DD}	CLKXO	76
26	DAGND	HSYNC_L	75
27	MODE [0]	VSYNCL_L	74
28	MODE [1]	VVALID	73
29	MODE [2]	HVALID	72
30	MODE [3]	ODD/EVEN	71
31	SCAN	C [0]	70
32	TEST [2]	C [1]	69
33	TEST [1]	C [2]	68
34	TEST [0]	C [3]	67
35	SLEEP	C [4]	66
36	RESET_L	C [5]	65
37	DV _{DD}	C [6]	64
38	DGND	C [7]	63
39	SCL	DGND	62
40	SDA	DV _{DD}	61
41	PLLSEL	Y [0]	60
42	CLKSEL	Y [1]	59
43	B [7]	Y [2]	58
44	B [6]	Y [3]	57
45	B [5]	Y [4]	56
46	B [4]	Y [5]	55
47	B [3]	Y [6]	54
48	B [2]	Y [7]	53
49	B [1]	DV _{DD}	52
50	B [0]	DGND	51

Pin No.	Pin Name	I/O	Description
1	DAVDD	-	AD part Power Supply
2	VRT2	O	Standard Voltage of AD Converter for S-Video C Parallel (high side)
3	VIN6	I	S-Video2 C Parallel (C-2) Input When not to use, Open or AGND connection
4	VIN5	I	Composite-5 or S-Video1 C Parallel (C-1) Input When not to use, Open or AGND connection
5	AVDD	-	Analog part Power Supply
6	AGND	-	Analog part Ground
7	ADIN2	I	Input of AD Converter for S-Video C Parallel (high side). When not to use, Open or AGND connection
8	AMPOUT2	O	S-Video C Parallel Amp Output
9	CLPOUT2	O	S-Video C Parallel Clamp Voltage Output
10	VRB2	O	Standard Voltage of AD Converter for S-Video C Parallel (low side)
11	AGND	-	Analog part Ground
12	AGND	-	Analog part Ground
13	VRB1	O	Standard Voltage of AD Converter for Composite or S-Video (Brightness Signal) (low side)
14	CLPOUT1	O	Composite or S-Video C Parallel Clamp Voltage Output (Brightness Signal)
15	AMPOUT1	O	Composite or S-Video C Parallel Amp Output (Brightness Signal)
16	ADIN1	I	Composite or S-Video C Parallel AD Converter Input (Brightness Signal)
17	VRCL1	I	Composite or S-Video C Parallel Clamp Voltage Input (Brightness Signal)
18	AGND	-	Analog part Ground
19	AVDD	-	Analog part Power Supply
20	VIN4	I	Composite-4 Input When not to use, Open or AGND connection
21	VIN3	I	Composite-3 Input When not to use, Open or AGND connection
22	VIN2	I	Composite-2 or S-Video2 Brightness Signal 8Y-29 Input When not to use, Open or AGND connection
23	VIN1	I	Composite-1 or S-Video1 Brightness Signal (Y-1) Input When not to use, Open or AGND connection
24	VRT1	O	Standard Voltage of AD Converter for Composite-2 or S-Video2 (Brightness Signal) (high side)
25	DAVDD	-	AD part Power Supply
26	DAGND	-	AD part Ground

Pin No.	Pin Name	I/O	Description
27 28 29 30	MODE[0] MODE[1] MODE[2] MODE[3]	I	<p>Input/Output Change Input when outside setting mode (Internal resistance Pull-Down)</p> <p>Inside/Outside terminals change Register MRA[0]. The Default of Register MRA[0] is External resistance Mode.</p> <p>MODE[3:2] Output Mode Selection 00: ITU-R BT.656(Processed by 8bit YCbCr SAV, EAV and blank) 01: 8bit (YCbCr) 10: 16bit (YCbCr) (ITU-RBT.601) 11: 24bit RGB</p> <p>MODE[1] Input Mode Selection 0: NTSC/1:PAL When the Setting of Register MRA[7] is NTSC/PAL Auto recognize and Input ITU-T.601 signal, it is invalidated.</p> <p>MODE[0] Input Mode Selection 0: ITU-RBT.601/1: Square Pixel NTSC 4 Fsc setting is possible only register setting is MRA[3:1].</p>
31	SCAN	I	Not use. Open or hold "0" (Internal resistance Pull-Down)
32	TEST[2]	I	Not use. Open or hold "0" (Internal resistance Pull-Down)
33	TEST[1]	I	Not use. Open or hold "0" (Internal resistance Pull-Down)
34	TEST[0]	I	Not use. Open or hold "0" (Internal resistance Pull-Down)
35	SLEEP	I	0: Normal / 1: Sleep
36	RESET_L	I	Reset Input (Active "L")
			Please Reset after Power-on supply
37	DVDD	-	Digital part Power Supply
38	DGND	-	Digital part Ground
39	SCL	I	I2C Bus clock Input
40	SDA	I/O	I2C Bus data Input / Output terminal
41	PLLSEL	I	Not use. Open or hold "0" internal resistance Pull-Down)
42	CLKSEL	I	<p>Clock selection Input terminal</p> <p>0: Double speed Input Mode / 1: Normal speed Input Mode</p> <p>Input Double frequency to System Clock to use Double speed Input Mode</p>
43~50	B[7~0]	O	<p>Data Output B[7]: MSB, B[0]: LSB</p> <p>RGB Output Mode time: B 8 bit Data Output</p> <p>It is Hi-z besides RGB Output Mode.</p> <p>Output Mode is set on the 27-28 pin or Register MRA[7:6]</p>
51	DGND	-	Digital part Ground
52	DVDD	-	Digital part Power Supply

Pin No.	Pin Name	I/O	Description		
53~60	Y[7~0]	O	Data Output B[7]:MSB, B[0]:LSB ITU-RBT.656 Output Mode time: YCbCr 8 bit Data Output 8 bit (YCbCr) Output Mode time: YCbCr 8 bit Data Output 16 bit (YCbCr) Output Mode time: Y 8 bit Data Output 24 bit RGB Output Mode time: G 8 bit Data Output		
61	DVDD	-	Digital part Power Supply		
62	DGND	-	Digital part Ground		
63~70	C[7~0]	O	Output Mode is set on the 27-28 pin or Register MRA[7:6]		
71	ODD/EVEN	O	Field Indication Output Odd Number Field time, "H" Output		
72	HVALID	O	Horizontal effectual pixel timing Output Effectual section time, "H" Output		
73	VVALID	O	Vertical effectual pixel timing Output Effectual section time, "H" Output		
74	VSYNC_L	O	Vertical synchronizing signal (V sink) Output		
75	HSYNC_L	O	Horizontal synchronizing signal (H sink) Output		
76	CLKXO	O	Pixel Clock Output Double speed Input Mode time (42 pin "0"): Half frequency of System Clock Output Normal speed Input Mode time (42 pin "0"): Equal frequency of System Clock Output		
77	CLKX2O	O	System Clock Output System Clock Input is output direct.		
78	DGND	-	Digital part Ground		
79	DVDD	-	Digital part Power Supply		
80	CLKX2O	I	System Clock Input (Select by Operation Mode)		
				Normal speed Input Mode	Double speed Input Mode
			NTSC ITU-RBT.601	13.5MHz	27MHz
			NTSC Square Pixel	12.272727MHz	24.545454MHz
			NTSC 4 Fsc setting is possible only register setting is MRA[3:1].	14.31818MHz	28.63636MHz
			PAL ITU-RBT.601	13.5MHz	27MHz
			PAL Square Pixel	14.75MHz	29.5MHz
81	STATUS[3]	O	Status Signal Output Select by Internal Register OMR[0] OMR[1]: 0 FIFO Over flow detection Output 0: No detection/1: detection OMR[1]: 1 CSYNC Output		

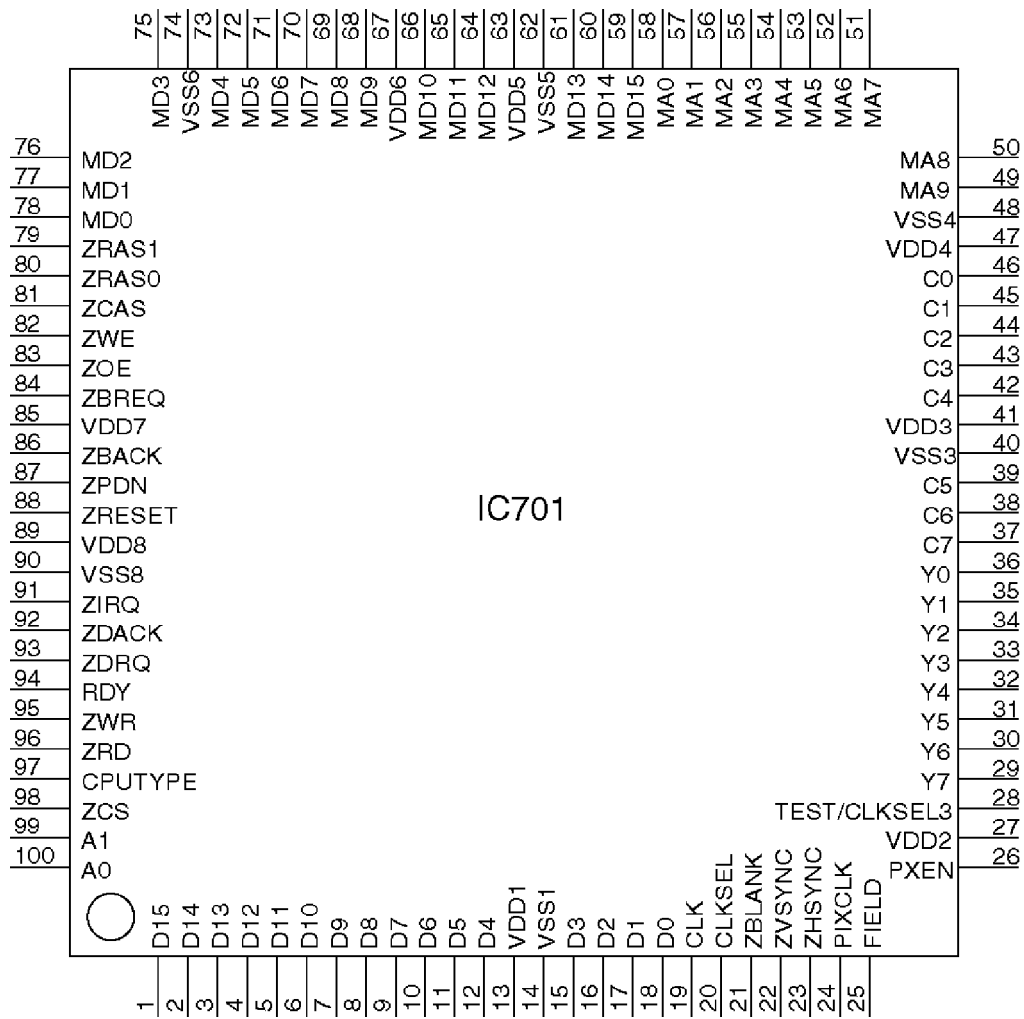
Pin No.	Pin Name	I/O	Description
82	STATUS[2]	O	Status Signal Output Select by Internal Register OMR[0] OMR[1]: 0 NTSC-PAL Recognition Output (Default) 0: NTSC/1: PAL OMR[1]: 1 HLOCK Synchronous detection Output 0: No detection/1: detection
83	STATUS[1]	O	Status Signal Output Un definition
84	M[7]	O	Field Memory Control signal; RE Output
85	M[6]	O	Field Memory Control signal; WE Output
86	M[5]	O	Field Memory Control signal; RSTR Output
87	M[4]	O	Field Memory Control signal; RSTW Output
88	M[3]	O	Test Output Terminal Normal "L" Output
89	M[2]	I	Select I2C Bus slave address "0": 1000001x "1": 1000011x (No Internal pull Register)
90	M[1]	I	Analog parts gain readings (MGC) and Input conversion of External terminal / Resister of Input terminal setting (No Internal pull Register)
91	M[0]	I	"0": External terminal Mode Gain readings setting: Use 94~96pin GAINS [2:0] Input Terminal setting: Use 97~99pin INS [2:0] "1": Register Mode Gain readings setting: Register ADC2 [6:4] Input Terminal setting: Register ADC1 [2:0] External terminal Mode settings time, Internal Resister is invalidated Select External Field Memory Control signal Output When not to use Fieldory, please set "0". "0": Invalidate M[7:4] Output "0": Validate M[7:4] Output
92	DGND	-	Digital part Ground
93	DVDD	-	Digital part Power Supply
94 95 96	GAINS[2] GAINS[1] GAINS[0]	I	Input conversion setting of AMP gain on External setting Mode time External terminal Mode: 90pin M[1]="0" (Internal resistance Pull-Down) GINS[2:0] Gain readings (x times) [000] 1.00 [001] 1.35 [010] 1.75 [011] 2.30 [100] 3.00 [101] 3.80 [110] 5.00 [111] Un definition

Pin No.	Pin Name	I/O	Description
97 98 99	INS[2] INS[1] INS[0]	I	Input conversion setting of Input terminal on External setting Mode time External terminal Mode:90pin M[1]="0" (Internal resistance Pull-Down) INS[2:0] Input terminal (x times) [000] VIN1 (23pin) Composite-1 [001] VIN1 (23pin) Composite-2 [010] VIN1 (23pin) Composite-3 [011] VIN1 (23pin) Composite-4 [100] VIN1 (23pin) Composite-5 [101] VIN1 (23pin) Y-1 VIN5 (4pin) C-1 [110] VIN2 (22pin) Y-2 VIN6 (23pin) C-2 [111] Setting impossible (ADC turns to SLEEP Mode)
100	DAGND	-	AD part Ground

Note:

Apply the same power supply voltage on all the Vcc pins. Apply the same power supply voltage on all the Vss pins, too.

15.5. IC701



Pin No.	Pin Name	I/O	Description
1	D15	I/O	Data Input/Output
2	D14	I/O	
3	D13	I/O	
4	D12	I/O	
5	D11	I/O	
6	D10	I/O	
7	D9	I/O	
8	D8	I/O	
9	D7	I/O	
10	D6	I/O	
11	D5	I/O	
12	D4	I/O	
13	VDD3	P	VDD (3.3V)
14	VSS	P	GND
15	D3	I/O	Data Input/Output
16	D2	I/O	
17	D1	I/O	
18	D0	I/O	

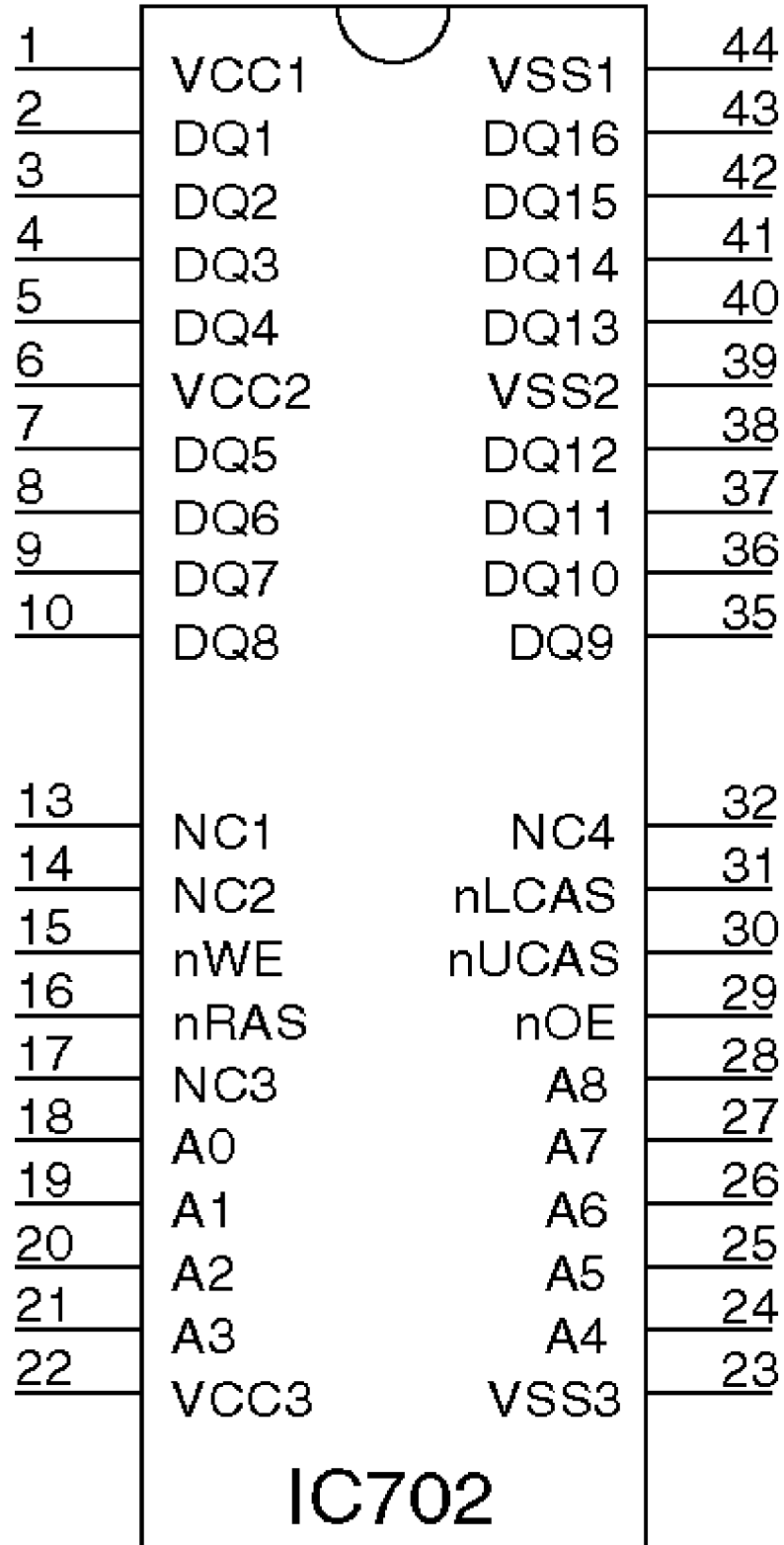
Pin No.	Pin Name	I/O	Description
19	CLK	I	Clock
20	CLKSEL	I	Clock Select
21	ZBLANK	I/O	Blank Signal
22	ZVSYNC	I	Vertical Sync Signal
23	ZHSYNC	I	Horizontal Sync Signal
24	PIXCLK	I	Pixel Clock
25	FIELD	I	Field Identification
26	PXEN	I	Pixel Output Enable
27	VDD5 (VDD3)	P	VDD (5V) (When 3.3V Simple Power VDD (3.3V))
28	TEST/CLKSEL3	I	Test/Clock Select
29	Y7	I/O	Brightness Data
30	Y6	I/O	
31	Y5	I/O	
32	Y4	I/O	
33	Y3	I/O	
34	Y2	I/O	
35	Y1	I/O	
36	Y0	I/O	
37	C7	I/O	Color-Difference Data
38	C6	I/O	
39	C5	I/O	
40	VSS	P	GND
41	V DD3	P	VDD (3.3V)
42	C4	I/O	
43	C3	I/O	
44	C2	I/O	
45	C1	I/O	
46	C0	I/O	
47	VDD5 (VDD3)	P	VDD (5V) (When 3.3V Simple Power VDD (3.3V))
48	VSS	P	GND
49	MA9	O	DRAM Address
50	MA8	O	
51	MA7	O	
52	MA6	O	
53	MA5	O	
54	MA4	O	
55	MA3	O	
56	MA2	O	
57	MA1	O	
58	MA0	O	

Pin No.	Pin Name	I/O	Description
59	MD15	I/O	DRAM Data
60	MD14	I/O	
61	MD13	I/O	
62	VSS	P	GND
63	V DD3	P	VDD (3.3V)
64	MD12	I/O	DRAM Data
65	MD11	I/O	
66	MD10	I/O	
67	VDD5 (VDD3)	P	VDD (5V) (When 3.3V Simple Power VDD (3.3V))
68	MD9	I/O	DRAM Data
69	MD8	I/O	
70	MD7	I/O	
71	MD6	I/O	
72	MD5	I/O	
73	MD4	I/O	
74	VSS	P	GND
75	MD3	I/O	DRAM Data
76	MD2	I/O	
77	MD1	I/O	
78	MD0	I/O	
79	ZRAS1	O	DRAM RAS1
80	ZRAS0	O	DRAM RAS0
81	ZCAS	O	DRAM CAS
82	ZWE	O	DRAM Write Enable
83	ZOE	O	DRAM Output Enable
84	ZBREQ	I	DRAM Bus Request
85	V DD3	P	VDD (3.3V)
86	ZBACK	O	DRAM Bus Acknowledge
87	ZPDN	I	Power Down
88	ZRESET	I	Reset
89	VDD5 (VDD3)	P	VDD (5V) (When 3.3V Simple Power VDD (3.3V))
90	VSS	P	
			GND
91	ZIRQ	O	Interrupt Request
92	ZDACK	I	DMA Acknowledge
93	ZDRQ	O	DMA Request
94	RDY/ZDTACK	O	80 Series Ready/68 Series DTACK
95	ZWR/ZDS	I	80 Series Write/68 Series Data Strobe
96	ZRD/RW	I	80 Series Read/68 Series Read & Write
97	CPUTYPE	I	CPU 80 Series and 68 Series Switch
98	ZCS	I	Chip Select
99	A1	I	Address
100	A0	I	

15.6. IC702

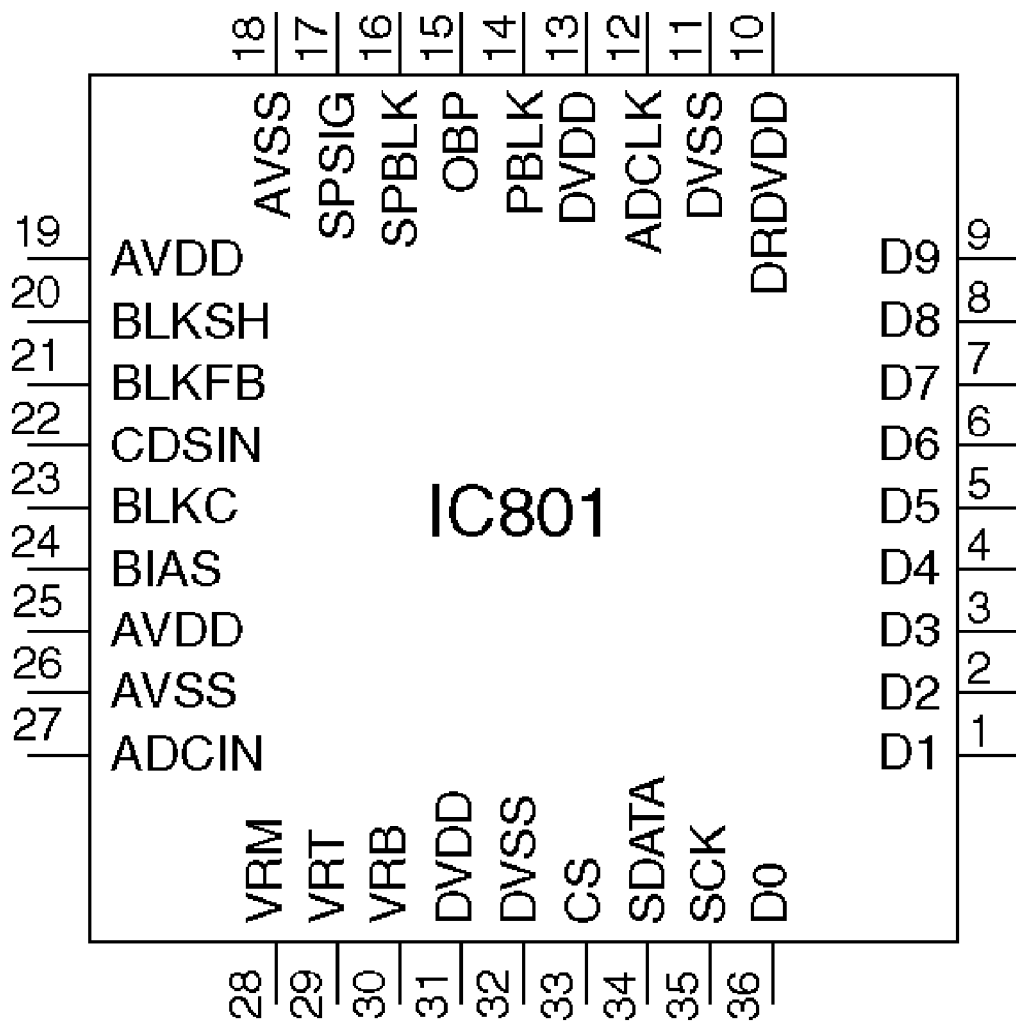
TSOP44

Top view



Pin Name	
A0 to A8	Address input
RAS	Low address strobe
UCAS	Column address strobe (Upper byte control)
LCAS	Column address strobe (Lower byte control)
WE	Write enable
OE	Output enable
I/O1 to I/O6	Data I/O
Vcc	Power supply
Vss	Ground
N.C.	No connection

15.7. IC801



Pin No.	Pin Name	I/O	Description
1~9	D1~D9	O	Digital output
10	DRDVDD	-	Power Supply terminal for Output Buffer (3V)
11	DVSS	-	Digital Ground (0V)
12	ADCLK	I	ADC transform Clock input terminal
13	DVDD	-	Digital Power Supply terminal (3V)
14	PBLK	I	Pre-blanking terminal
15	OBP	I	Optical Black Pulse input terminal
16	SPBLK	I	Black level sampling Clock terminal
17	SPSIG	I	Signal level sampling Clock terminal
18	AVSS	-	Analog Ground (0V)
19	AVDD	-	Analog Power Supply terminal (3V)
20	BLKSH	-	Black level S/H terminal
21	BLKFB	-	Black level FB terminal
22	CDSIN	I	CDS input terminal
23	BLKC	-	Black level C terminal
24	BIAS	-	Inside Bias terminal Connect 33k Ω resistance between AV and SS
25	AVDD	-	Analog Power Supply terminal (3V)
26	AVSS	-	Analog Ground (0V)
27	ADCIN		ADC input terminal
28	VRM	-	Reference voltage terminal1 Connect 0.1 μ F Ceramic Condenser between AV and SS
29	VRT	-	Reference voltage terminal3 Connect 0.1 μ F Ceramic Condenser between AV and SS
30	VRB	-	Reference voltage terminal2 Connect 0.1 μ F Ceramic Condenser between AV and SS

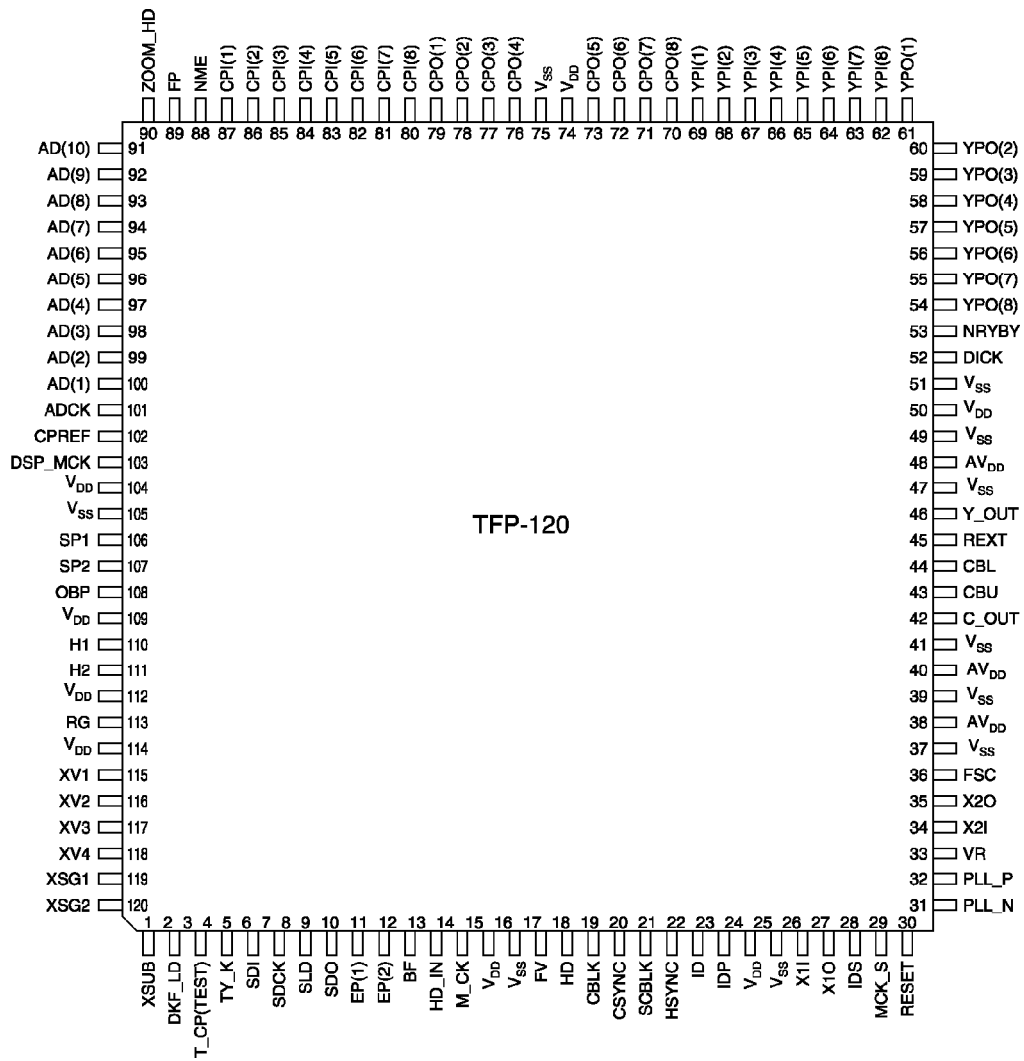
15.8. IC802

1	SUBO	VSb	20
2	VSS	VDD2b	19
3	BO1	BO2	18
4	VDD2a	TO2	17
5	TO1	VDD1	16
6	VCC	GND	15
7	TI1	TI2	14
8	PG1	RG2	13
9	BI1	BI2	12
10	SUBI	NC	11

IC802

Pin No.	Pin Name	I/O	Description
1	SUBO	O	VOD Shutter Drive Pulse Input
2	VSS	-	VL power supply
3	BO1	O	Two readings Pulse Output
4	VDD2a	-	VMa (three readings driver) Power Supply
5	TO1	O	Three readings Pulse Output
6	VCC	-	Logic Power Supply
7	TI1	I	Three readings driver Input
8	PG1	I	
9	BI1	I	Two readings driver Input
10	SUBI	I	VOD Shutter Drive Pulse Input
11	NC	-	No Connection
12	BI2	I	Two readings driver Input
13	PG2	I	Three readings driver Input
14	TI2	I	
15	GND	-	GND
16	VDD1	-	VH power supply
17	TO2	O	Three readings Pulse Output
18	BO2	O	Two readings Pulse Output
19	VDD2b	-	VHH (for Two readings driver) Power Supply
20	Vsb	-	VHH (for SUB Drive) Power Supply

15.9. IC803



Pin No.	Pin Name	I/O	Description
1	XSUB	O	CCD control pulse
2	DKF_LD	I	Line input Load
3	T_CP	I	Test pin (GND input)
4	TY_K	I	Title Killer SW "1" → On, "0" → Off ICD
5	SDI	I	State Data Input
6	SDCK	I	State Data Set Clock
7	SLD	I	State Data latch pulse
8	SDO	O	AWB, AE, Detect Output
9	EP(1)	O	Iris detect area set pulse SP-A7[8] output SW
10	EP(2)	O	Iris detect area set pulse SP-A7[8] output SW
11	BF	O	Burst flag output
12	HD_IN	I	External CSYNC input
13	M_CK	O	Micro controller clock output [1/2 or 1/4 of crystal1]
14	VDD	-	3V Power supply
15	VSS	-	GND
16	FV	O	Vertical Synchronization pulse
17	HD	O	Horizontal Synchronization pulse
18	CBLK	O	Blanking Pulse
19	CSYNC	O	SYNC pulse
20	SCBLK	O	Sub carrier Blanking pulse (for SECAM)
21	HSYNC	O	Horizontal SYNC pulse (for SECAM)
22	ID	O	Detection pulse for SECAM
23	IDP	O	Detection pulse for SECAM
24	VDD	-	3V Power supply
25	VSS	-	GND
26	X1I	I	2fs crystal input
27	X1O	O	2fs crystal output
28	IDS	I	Line detection signal input
29	MCK_S	I	13pin MCK frequency set SW (1=1/2, 0=1/4) IC
30	RESET	I	LSI reset
31	PLL_N	O	Output for PLL
32	PLL_P	O	Output for PLL
33	VR	I	Vertical Synchronization signal input
34	X2I	I	4fsc crystal input
35	X2O	O	4fsc crystal output
36	FSC	O	fsc output
37	VSS	-	GND
38	AVDD	-	Analog Power Supply 3V
39	VSS	-	GND
40	AVDD	-	Analog Power Supply 3V

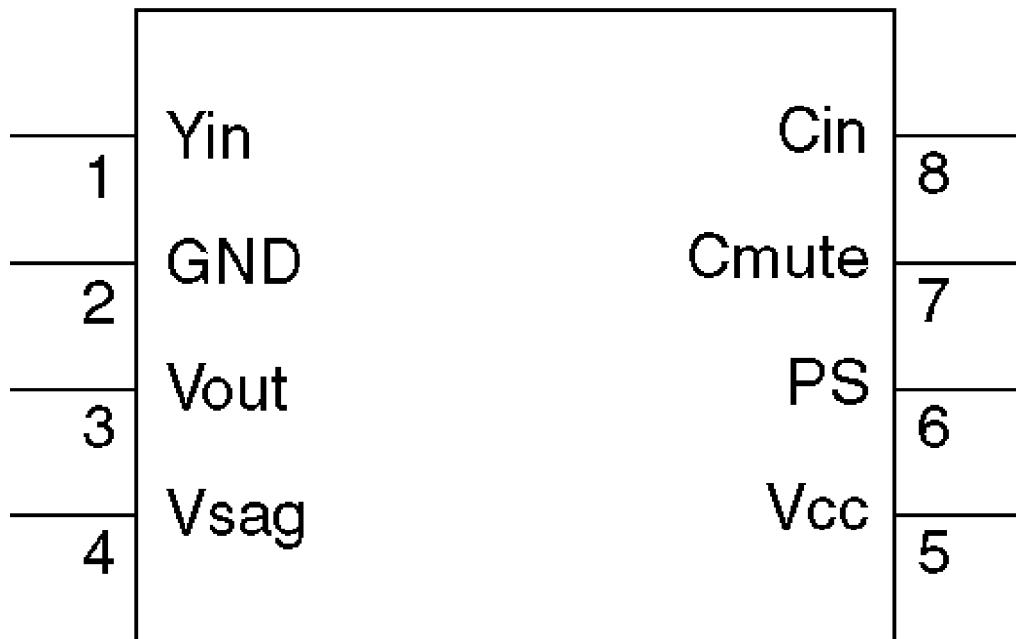
40	C_OUT	-	Analog Power Supply 3V
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Pin No.	Pin Name	I/O	Description
41	VSS	-	GND
42	C_OUT	O	chroma Analog output
43	CBU	I	D/A Upper bits current supply
44	CBLK	I	D/A Uup current supply
45	REXT	I	Reference Voltage input
46	Y_OUT	O	Y Analog Signal Output
47	VSS	-	GCD
48	AVDD	-	Analog Power Supply 3V
49	VSS	-	GND
50	VDD	-	Digital Power Supply 3V
51	VSS	-	GND
52	DICK	O	Digital interface clock
53	NRYBY	O	Color-difference signal phase clock
54	YPO(8)	O	Y Parallel Output (8); MSB
55	YPO(7)	O	Y Parallel Output (7)
56	YPO(6)	O	Y Parallel Output (6)
57	YPO(5)	O	Y Parallel Output (5)
58	YPO(4)	O	Y Parallel Output (4)
59	YPO(3)	O	Y Parallel Output (3)
60	YPO(2)	O	Y Parallel Output (2)
61	YPO(1)	O	Y Parallel Output (1); LSB
62	YPI(8)	I	Y Parallel Input (8); MSB
63	YPI(7)	I	Y Parallel Input (7)
64	YPI(6)	I	Y Parallel Input (6)
65	YPI(5)	I	Y Parallel Input (5)
66	YPI(4)	I	Y Parallel Input (4)
67	YPI(3)	I	Y Parallel Input (3)
68	YPI(2)	I	Y Parallel Input (2)
69	YPI(1)	I	Y Parallel Input (1); LSB
70	CPO(8)	O	C Parallel Output (8); MSB
71	CPO(7)	O	C Parallel Output (7)
72	CPO(6)	O	C Parallel Output (6)
73	CPO(5)	O	C Parallel Output (5)
74	VDD	-	3V Power supply
75	VSS	-	GND
76	CPO(4)	O	C Parallel Output (4)
77	CPO(3)	O	C Parallel Output (3)
78	CPO(2)	O	C Parallel Output (2)
79	CPO(1)	O	C Parallel Output (1); LSB
80	CPI(8)	I	C Parallel Input (8); MSB
81	CPI(7)	I	C Parallel Input (7)
82	CPI(6)	I	C Parallel Input (6)

Pin No.	Pin Name	I/O	Description
83	CPI(5)	I	C Parallel Input (5)
84	CPI(4)	I	C Parallel Input (4)
85	CPI(3)	I	C Parallel Input (3)
86	CPI(2)	I	C Parallel Input (2)
87	CPI(1)	I	C Parallel Input (1); LSB
88	MME	O	Line memory Control output
89	FP	O	Field Pulse
90	ZOOM_HD	O	Zoom HD Output
91	AD(10)	I	AD Input (10); MSB
92	AD(9)	I	AD Input (9)
93	AD(8)	I	AD Input (8)
94	AD(7)	I	AD Input (7)
95	AD(6)	I	AD Input (6)
96	AD(5)	I	AD Input (5)
97	AD(4)	I	AD Input (4)
98	AD(3)	I	AD Input (3)
99	AD(2)	I	AD Input (2)
100	AD(1)	I	AD Input (1); LSB
101	ADCK	O	AD Clock
102	CPREF	O	Clamp Reference Output
103	DSP-MCK	O	Micro Processor clock output SP-A7[8] SW
104	VDD	-	3V Power supply
105	VSS	-	GND
106	SP1	O	AGC. CDS. IC Sampling Pulse
107	SP2	O	AGC. CDS. IC Sampling Pulse
108	OBO	O	Optical Black Pulse output
109	VDD	-	5V Power supply (H1/H2 Power Supply)
110	H1	O	CCD Sensor Drive Pulse
111	H2	O	CCD Sensor Drive Pulse
112	VDD	-	5V Power supply (RG Power Supply)
113	RG	O	CCD Control Reset Gate
114	VDD	-	3V Power supply
115	XV1	O	CCD Sensor Vertical Control pulse
116	XV2	O	CCD Sensor Vertical Control pulse
117	XV3	O	CCD Sensor Vertical Control pulse
118	XV4	O	CCD Sensor Vertical Control pulse
119	XSG1	O	CCD Sensor Vertical Control pulse
120	XSG2	O	CCD Sensor Vertical Control pulse

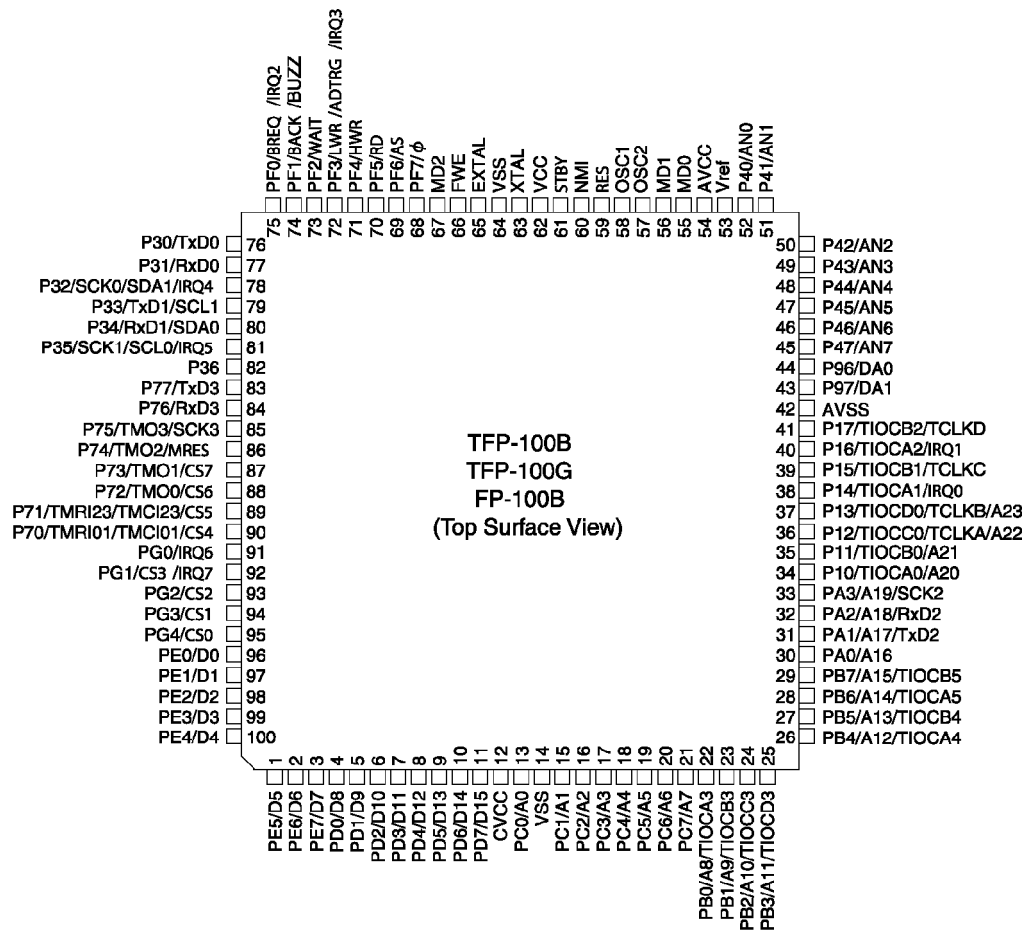
15.10. IC804

IC804



Pin No.	Pin Name	I/O	Description
1	Yin	I	Brightness signal Input
2	GND	-	GND
3	Vout	O	Video Out
4	Vsag	O	Video Sag Revision
5	Vcc	-	Vcc
6	Power Save CTL	I	Power Save Control
7	C Mute CTL	I	Color signal mute Control
8	Cin	I	Color signal Input

15.11. IC902



Pin No.	Pin Name	Description
1	PE5/D5	Unassigned (LOW Output)
2	PE6/D6	Unassigned (LOW Output)
3	PE7/D7	DSP RESET
4	PD0/D8	Unassigned (LOW Output)
5	PD1/D9	Unassigned (LOW Output)
6	PD2/D10	Unassigned (LOW Output)
7	PD3/D11	Unassigned (LOW Output)
8	PD4/D12	Unassigned (LOW Output)
9	PD5/D13	Unassigned (LOW Output)
10	PD6/D14	Unassigned (LOW Output)
11	PD7/D15	Unassigned (LOW Output)
12	CVCC	Power Supply (+3.3V)
13	PC0/A0	Unassigned (LOW Output)
14	VSS	GND
15	PC1/A1	Unassigned (LOW Output)
16	PC2/A2	Unassigned (LOW Output)
17	PC3/A3	Unassigned (LOW Output)
18	PC4/A4	Unassigned (LOW Output)
19	PC5/A5	Unassigned (LOW Output)

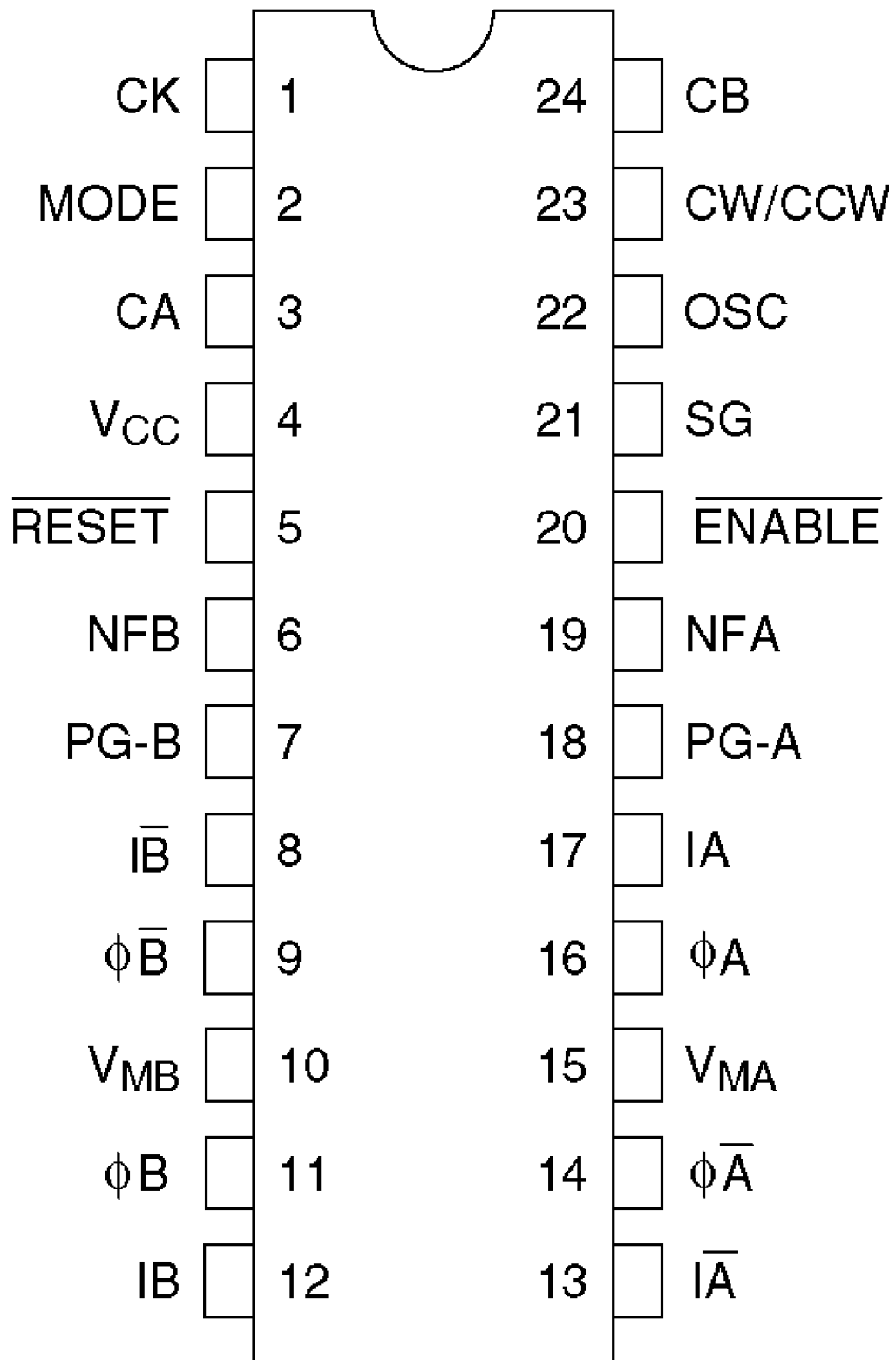
Pin No.	Pin Name	Description
20	PC6/A6	Unassigned (LOW Output)
21	PC7/A7	Unassigned (LOW Output)
22	PB0/A8/TIOCA3	Unassigned (LOW Output)
23	PB1/A9/TIOCB3	Unassigned (LOW Output)
24	PB2/A10/TIOCC3	Unassigned (LOW Output)
25	PB3/A11/TIOCD3	Unassigned (LOW Output)
26	PB4/A12/TIOCA4	Image Read Signal
27	PB5/A13/TIOCB4	Unassigned (LOW Output)
28	PB6/A14/TIOCCA5	Focus Motor Clock
29	PB7/A15/TIOCB5	PWM Signal (For Iris Control)
30	PA0/A16	Unassigned (LOW Output)
31	PA1/A17/TxD2	RS-232C TXD
32	PA2/A18/RxD2	RS-232C RXD
33	PA3/A19/SCK2	Unassigned (LOW Output)
34	P10/TIOCA0/A20	Zoom Motor Clock
35	P11/TIOCB0/A21	Zoom / Focus Motor Enable
36	P12/TIOCC0/TCLKA/ A22	Zoom Motor Direction
37	P13/TIOCD0/TCLKB/ A23	Unassigned (LOW Output)
38	P14/TIOCA1/IRQ0	Unassigned (LOW Output)
39	P15/TIOCB1/TCLKC	Zoom / Focus Motor Reset
40	P16/TIOCA2/IRQ1	Focus Motor Direction
41	P17/TIOCB2/TCLKD	Unassigned (LOW Output)
42	AVSS	Analog GND
43	P97/DA1	Unassigned (External Pull-Down)
44	P96/DA0	Unassigned (External Pull-Down)
45	P47/AN7	Unassigned (External Pull-Down)
46	P46/AN6	Unassigned (External Pull-Down)
47	P45/AN5	Unassigned (External Pull-Down)
48	P44/AN4	RS-232C DR
49	P43/AN3	Video Power Status
50	P42/AN2	Focus Encoder
51	P41/AN1	Zoom Encoder
52	P40/AN0	Lens F No.
53	Vref	Analog Vref
54	AVCC	Analog Power Supply (+5V)
55	MD0	MODE 0

Pin No.	Pin Name	Description
56	MD1	MODE 1
57	OSC2	Sub Clock Oscillator 2
58	OSC1	Sub Clock Oscillator 1
59	RES	Reset
60	NMI	NMI
61	STBY	STANDBY
62	VCC	Power Supply (+3.3V)
63	XTAL	Xtal
64	VSS	GND
65	EXTAL	External Xtal
66		Flash Write Enable
67	MD2	MODE 2
68	PF7/ ϕ	Clock Out
69	PF6/AS	Unassigned (LOW Output)
70	PF5/RD	Unassigned (LOW Output)
71	PF4/HWR	HWR
72	PF3/LWR/ADTRG/ IRQ3	DSP EP1 (Interrupt)
73	PF2/WAIT	Zoom Mode
74	FP1/BACK/BUZZ	CDS Chip Select
75	PF0/BREQ/IRQ2	DSP EP2 (Interrupt)
76	P30/TxD0	DSP SDI
77	P31/RxD0	DPS SDO
78	P32/SCK0/SDA1/ IRQ4	DSP SDCLK
79	P33/TxD1/SCL1	DSP SLD
80	P34/RxD1/SDA0	I2C Bus SDA
81	P35/SCK1/SCL0/ IRQ5	I2C Bus SCL
82	P36	LENS LED Control
83	P77/TxD3	Unassigned (High Output)
84	P76/RxD3	Unassigned (High Output)
85	P75/TMO3/SCK3	Unassigned (LOW Output)
86	P74/TMO2/MRES	Unassigned (LOW Output)
87	P73/TMO1/CS7	Unassigned (LOW Output)
88	P72/TMO0/CS6	Unassigned (LOW Output)
89	P71/TMRI23/TMCI23/ CS5	Unassigned (LOW Output)
90	P70/TMRI01/TMCI01/ CS4	Unassigned (LOW Output)
91	PG0/IRQ6	Unassigned (LOW Output)
92	PG1/CS3/IRQ7	DSP FV
93	PG2/CS2	DSP FP

Pin No.	Pin Name	Description
94	PG3/CS1	Unassigned (LOW Output)
95	PG4/CS0	Unassigned (LOW Output)
96	PE0/D0	Unassigned (LOW Output)
97	PE1/D1	Unassigned (LOW Output)
98	PE2/D2	Unassigned (LOW Output)
99	PE3/D3	Unassigned (LOW Output)
100	PE4/D4	Unassigned (LOW Output)

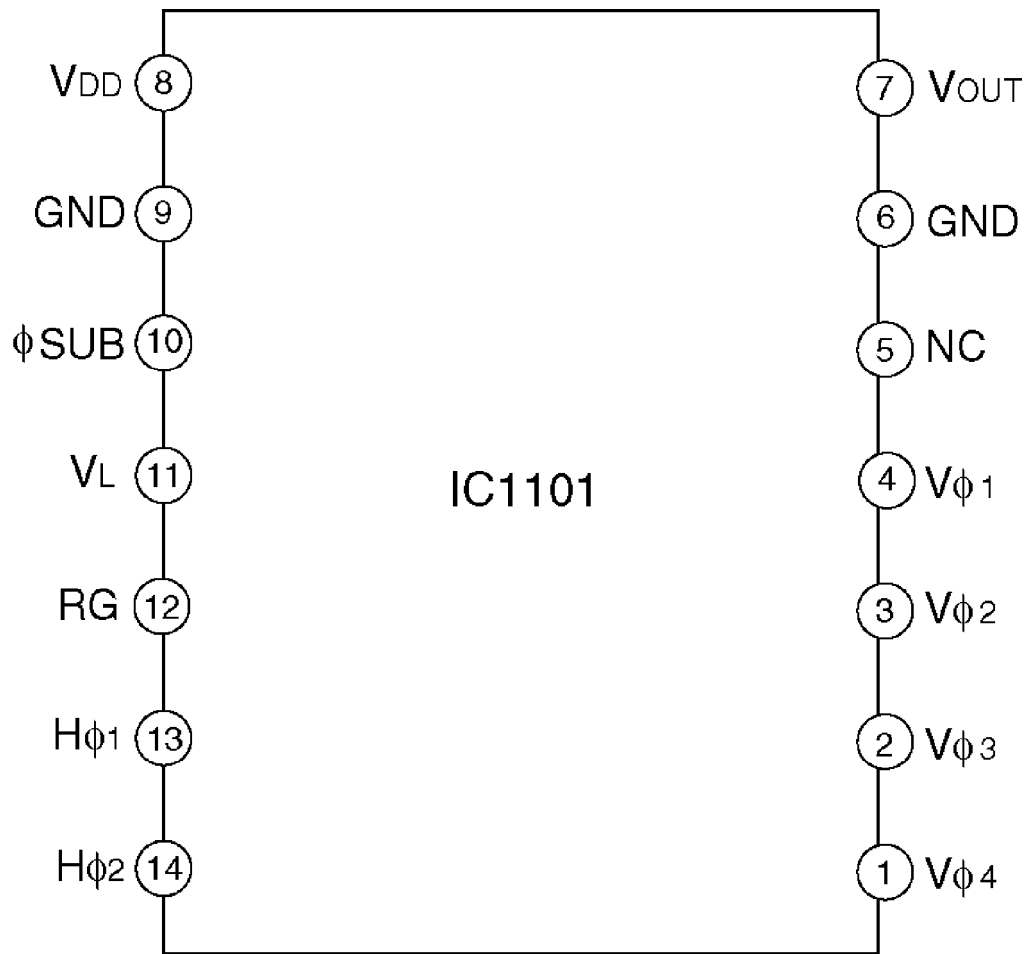
15.12. IC1001, IC1002

IC1001, IC1002



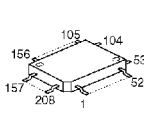
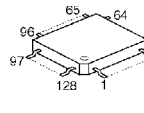
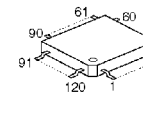
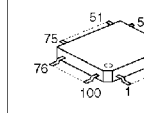
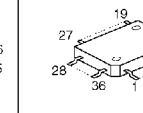
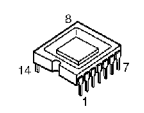
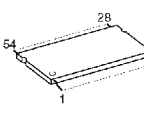
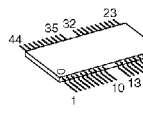
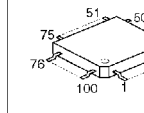
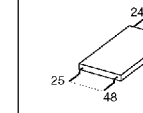
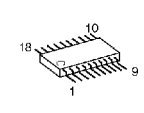
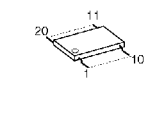
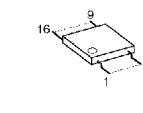
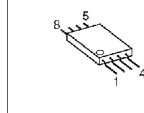
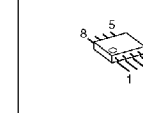
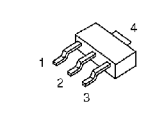
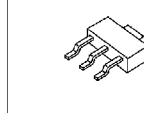
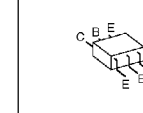
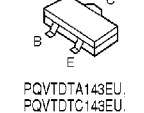
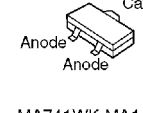
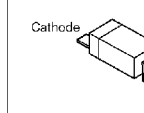
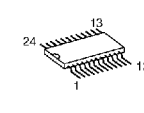
Pin No.	Pin Name	I/O	Description
1	CK	I	Clock signal Input
2	MODE	I	Excitation Mode setting terminal
3	CA	-	Condenser outside terminal for reducible noise
4	VCC	-	Logic side Power Supply terminal
5	_RESET	I	Reset signal terminal
6	NFB	O	B Channel Current detection terminal
7	PG-B	-	Power Ground B
8	_IB	I	Upper side PNP Transistor base terminal (_B aspect)
9	ϕ_B	O	B output
10	VMB	-	Output side Power Supply B
11	ϕ_B	O	B output
12	IB	O	Upper side PNP Transistor base terminal (B aspect)
13	_IA	O	Upper side PNP Transistor base terminal (_A aspect)
14	ϕ_A	O	_A output
15	VMA	-	Output side Power Supply A
16	ϕ_A	O	A output
17	IA	O	Upper side PNP Transistor base terminal (A aspect)
18	PG-A	-	Power Ground A
19	NFA	O	A Channel Current detection terminal
20	_ENABLE	I	Enabled signal Input
21	SG	-	Signal Ground
22	OSC	I	Inside Oscillation Frequency setting terminal : Condenser outside
23	CW/CCW	I	Obverse rotation/Reverse rotation signal terminal
24	CB	-	Condenser outside terminal for reducible noise

15.13. IC1101



Pin No.	Pin Name	I/O	Description
1	$V\phi_4$	I	Vertical register transfer clock
2	$V\phi_3$	I	Vertical register transfer clock
3	$V\phi_2$	I	Vertical register transfer clock
4	$V\phi_1$	I	Vertical register transfer clock
5	NC	I	No connection
6	GND	I	GND
7	VOUT	O	Signal output
8	VDD	I	Supply voltage
9	GND	I	GND
10	ϕ_{SUB}	I	Substrate clock
11	VL	I	Protective transistor bias
12	RG	I	Reset gate clock
13	$H\phi_1$	I	Horizontal register transfer clock
14	$H\phi_2$	I	Horizontal register transfer clock

16. TERMINAL GUIDE OF ICS, TRANSISTORS AND DIODES

 C2DBYJ000009	 C1CB00001550	 C1AB00001347	 C1AB00001649, C1AB00001290	 C1AB00001761
 C4ABF0000019	 C3ABPG000063	 C3ABKG000113	 PSWI2HCM280M	 PSWI1HCM280M
 PQVIRT4543B	 UPD16510GR	 C0JBAN000171	 C0FBBD000102, C0ABBB000105, C0ABBA000041	 C1AB00001606, C0DBAZH00009
 C0JBAB0000568, B1GFCFJJ0010	 PQVIC68B102M, C0CBADC00044, C0EBE0000231, C0DBAGC00014, C0EBC0000083, C0JBAB0000567	 C0CBADD00009	 B1DHCD000018	 B1HDGFA00001
 PQVTDTA143EU, PQVTDTC143EU, 2SD601A, 2SB1218A, 2SC4081R, UN9211, B1CFMD000004, B1DHAC000002, B1ABAD000004	 Cathode Anode Anode MA3082	 Cathode Anode Anode MA741WK, MA143A, MA720, MA133, MA3051	 Cathode Anode MA736	 Cathode Anode MA2Z72000, MA111
 B3NAA0000040	 PFVIA2919SLB, C0GBB0000016			

17. HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, If you have solder (large amount) a soldering iron and a cutter knife, you can easily remove IC's even though large than 100 pin.

17.1. PREPARATION

- SOLDER / Sparkle Solder 115A-1, 115B-1 or Almit Solder KR-19, KR-

19RMA

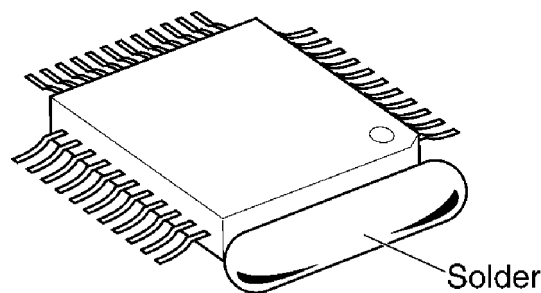
- Soldering iron / Recommended power consumption is between 30 W to 40 W. / Temperature of Copper Rod 662 ± 50°F (350 ± 10°C) / (An expert may handle a 60~80 W iron, but beginner might damage foil by overheating.)
- Flux / HI115 Specific gravity 0.863 / (Original flux should be replaced daily.)

17.2. FLAT PACKAGE IC REMOVE PROCEDURE

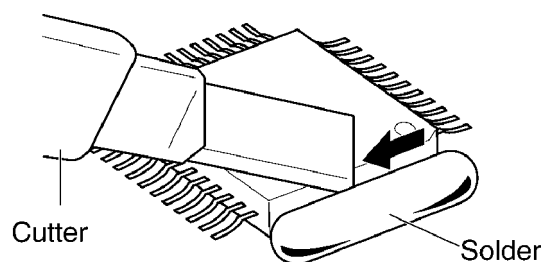
1. When all of the IC lead can not been seen at the standard degree, fill with large quantities of solder.

Note:

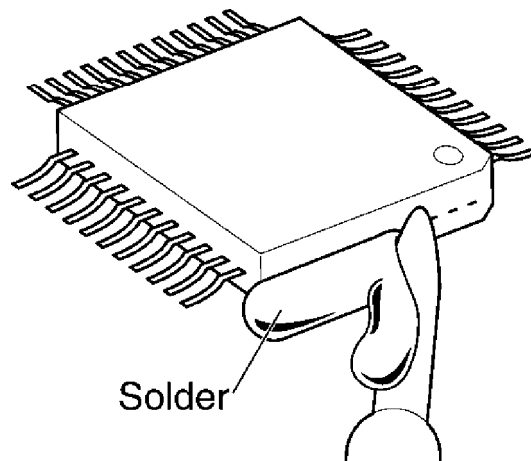
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C.board's pattern. If you do not fill with large quantities of solder as in step 1 the P.C.board pattern may be removed.



2. Using a cutter, cut the lead at the source. (Cut the contents with the cutter lightly 5 or 6 times.)



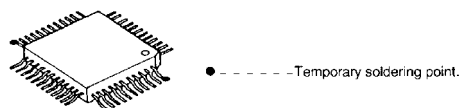
3. Remove when the solder melts. (Remove the lead at the same time.)



After removing the Flat IC and when attaching the new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly.

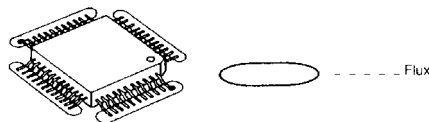
17.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1. Temporary fix FLAT PACKAGE IC by soldering on two marked pins.

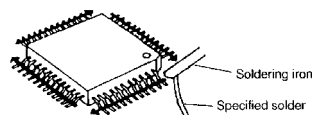


*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux for all pins of FLAT PACKAGE IC.

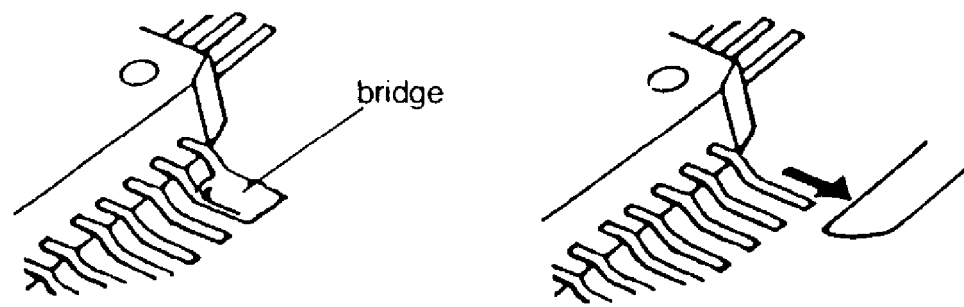


3. Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.

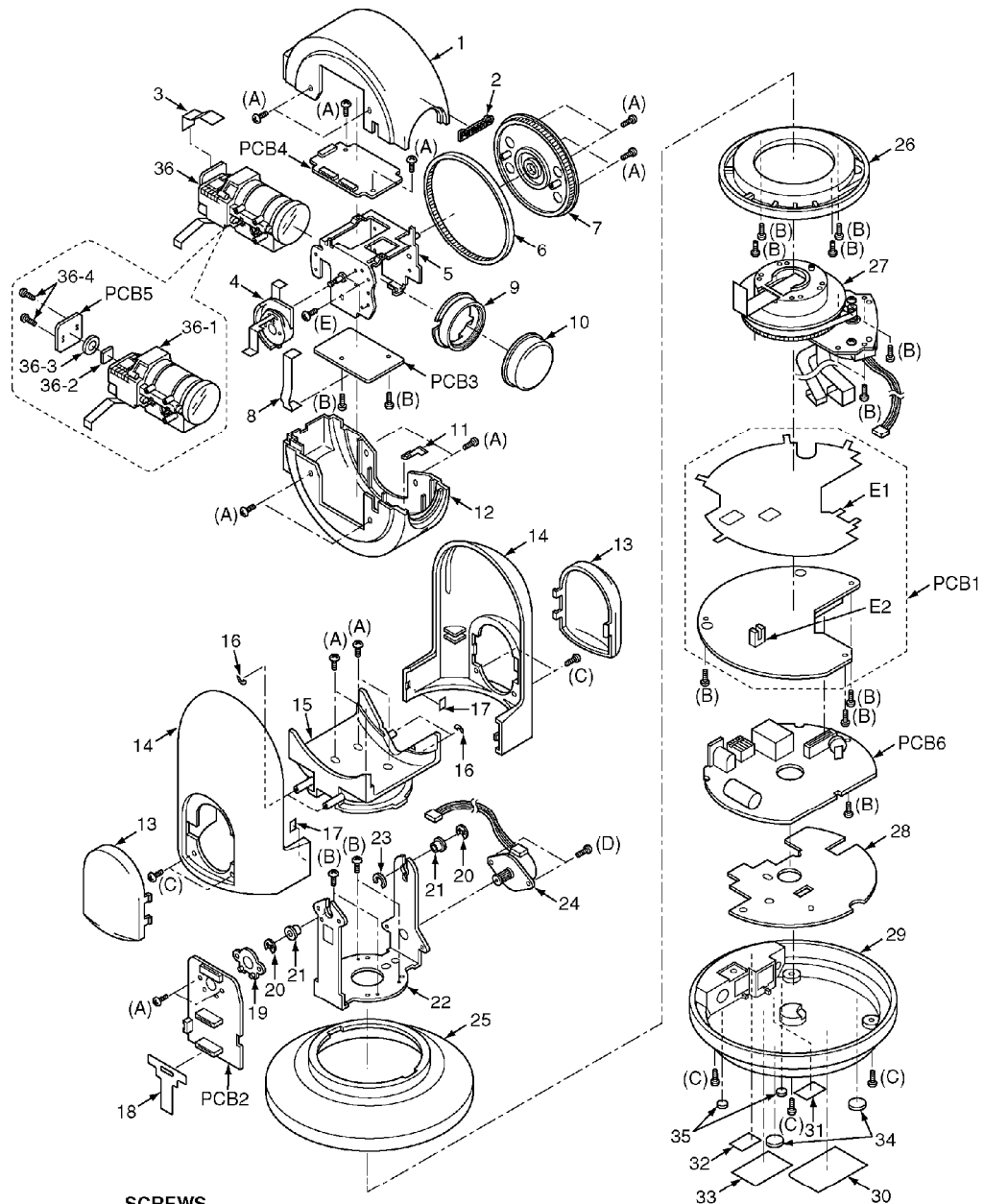


17.4. BRIDGE MODIFICATION PROCEDURE




1. Lightly re-solder the bridged portion.
2. Remove the remaining solder along pins using a soldering iron as shown in the figure below.





18. CABINET AND ELECTRICAL PARTS LOCATION

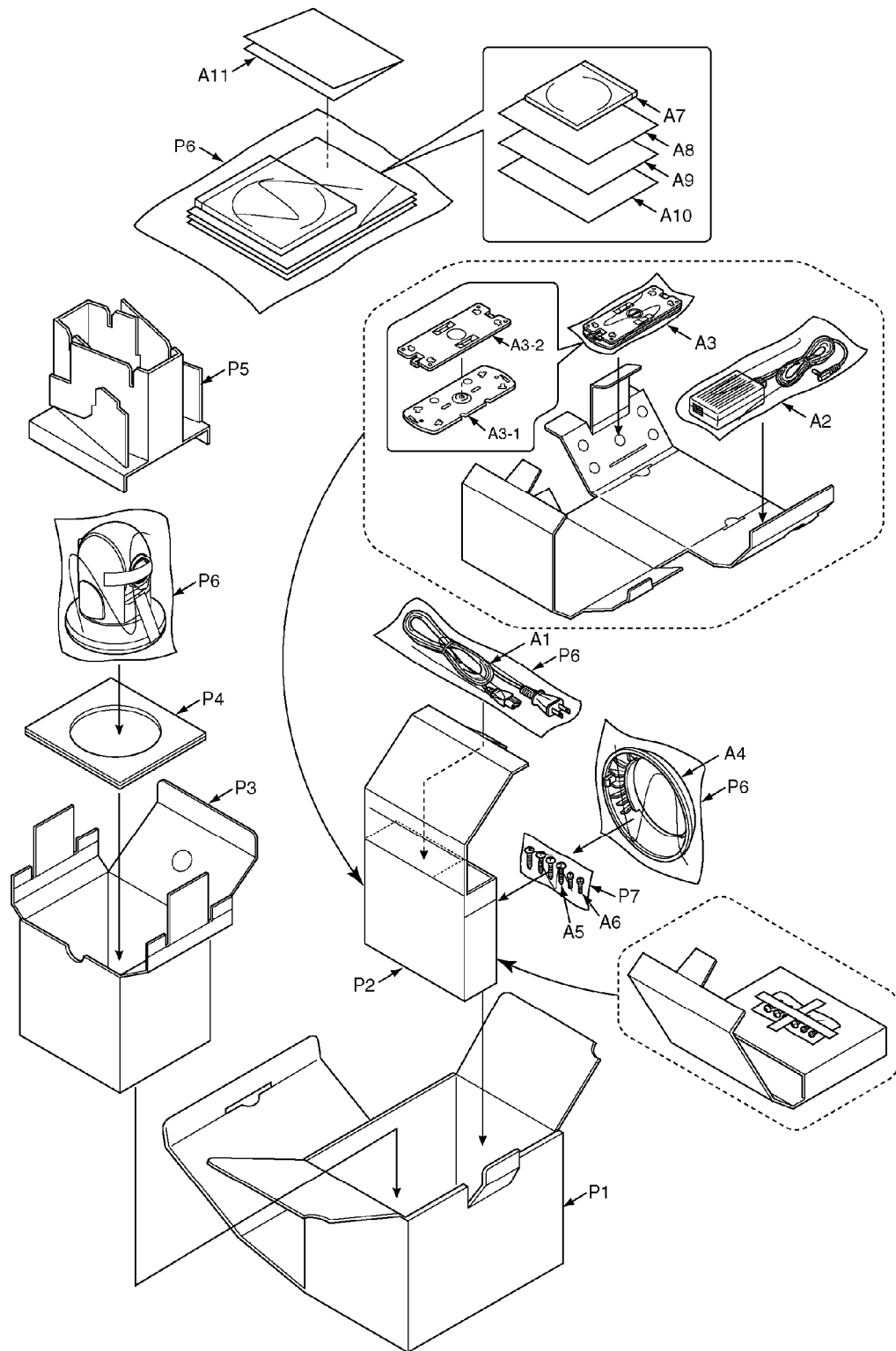


SCREWS

Ref No.	Figure	Parts No.
(A)		XTW2+5L
(B)		XTB2+6G
(C)		XTW26+10P

Ref No.	Figure	Parts No.
(D)		XYN26+C4
(E)		XQN16+C45FZ

19. ACCESSORIES AND PACKING MATERIALS



20. REPLACEMENT PARTS LIST

Note:


1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for

this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.

2. Important safety notice

Components identified by the  mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.

4. ISO code (Example : ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.

5. RESISTORS & CAPACITORS

Unless otherwise specified;

All resistors are in ohms (Ω), k=1000 Ω , M=1000k Ω

All capacitors are in MICRO FARADS (μ F), p= μ (μ F)



*Type & Wattage of Resistor

Type					
ERC:Solid ERD:Carbon PQ4R:Chip		ERX:Metal Film ERG:Metal Oxide ERO:Metal Film		PQRD:Carbon PQRQ:Fuse ERF:Wire Wound	
Wattage					
10,16,18:1/8W		14,25,S2:1/4W		12,50,S1:1/2W	
		1:1W		2:2W 5:5W	
ECFD:Semi-Conductor ECQS:Styrol PQCBX,ECUV:Chip ECMS:Mica		ECCD,ECKD,PQCBBC,PQVP : Ceramic ECQM,ECQV,ECQE,ECQU,ECQB : Polyester ECEA,ECSZ,ECOS : Electrolytic ECQP : Polypropylene			
Voltage					
ECQ Type		ECQG ECQV Type	ECSZ Type	Others	
1H : 50V 2A : 100V 2E : 250V 2H : 500V		05 : 50V 1 : 100V 2 : 200V	OF : 3.15V 1A : 10V 1V : 35V OJ : 6.3V	OJ : 6.3V 1A : 10V 1C : 16V 1E,25 : 25V 1V : 35V 50,1H : 50V 1J : 63V 2A : 100V	

20.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PSKE1063Y1	COVER, TILT (UPPER)	ABS-V0
2	PSGB1005Z	BADGE, PANASONIC	
3	PSJE1037Z	LEAD WIRE, FFC (VIDEO-CCD)	
4	PSZE1HCM180N	COVER, CABLE HOLDER	POM-HB
5	PSMH1254Z	CHASSIS, LENS	
6	PSDV1003Z	FLAT BELT, TILT BELT	
7	PSHR1287Z	GEAR, TILT GEAR	POM-HB
8	PSUP1435Z	LEAD WIRE, FFC (VIDEO-LENS)	
9	PSKV1034Z1	COVER, LENS	ABS-V0
10	PSHR1303Z	COVER, LENS PROTECTION	
11	PSHR1285Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
12	PSKE1064Z1	COVER, TILT (LOWER)	ABS-V0
13	PSKV1033Z1	COVER, PAN SCREW	ABS-V0
14	PSKV1032Z1	COVER, PAN	ABS-V0
15	PSKE1065Z1	COVER, PAN (LOWER)	ABS-V0
16	PSHX1217Z	SPACER	
17	PSHX1215Y	SPACER	
18	PSHX1213Z	PLASTIC PARTS, FFC SHEET	
19	PSHR1289Z	SPACER, TILT BOARD	ABS-V0
20	XUC3	RETAINING RING	
21	B-F4-73	SPACER	
22	PSMH1257Z	FRAME, TILT	
23	PSHX1214X	SPACER	
24	PSWQ2HCM180N	DC MOTOR, TILT	
25	PSKM1108Z1	CABINET BODY	ABS-V0
26	PSHR1291Z	IDLER PULLEY	POM-HB
27	PSWQ1HCM180N	DC MOTOR, PAN	POM-HB
28	PSMH1265Z	HEAT SHIELD PARTS, SHEET	
29	PSKF1076Z1	CABINET COVER	ABS-V0
30	PSGT2426Z	NAME PLATE	
31	PSQT1999Z	LABEL, AC ADAPTOR CAUTION	
32	PSQT2000Z	LABEL, FACTORY DEFAULT	
33	PSQT2001Z	LABEL, FCC CAUTION	
34	PSHA1012Z	FOOT RUBBER, LEGS (BIG)	
35	PSHA1013Z	FOOT RUBBER, LEGS (SMALL)	
36	PSWEHCM280M	CCD UNIT ASS'Y (RTL)	
36-1	VXW0482	LENS UNIT	
36-2	PSOF1001Z	LPF	
36-3	PSHG1203Z	CCD RUBBER	
36-4	XQN16+CJ6	SCREW	
PCB5		REFER TO THE 20.7. CCD UNIT PARTS	

20.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PSJA1069Z	POWER CORD (AC CORD)	
A2	PSLP1242Y	AC ADAPTOR	
A3	PSZMHCM180N	MOUNTING BRACKET, CEILING STAY PLATE ASS'Y	
A3-1	PSZMHCM280M	MOUNTING BRACKET, CEILING STAY PLATE 1	
A3-2	PSMD1045Z	MOUNTING BRACKET, CEILING STAY PLATE 2	
A4	PSKL1023Z1	STAND, CEILING ATTACHMENT	ABS-V0
A5	XTB4+20AFY	SCREW	
A6	XYN3+J6FY	SCREW	
A7	PSQX2904ZCD	CD-ROM	
A8	PSQW2018Z	LEAFLET	
A9	PSQX2830Z	OPERATING INSTRUCTIONS	
A10	PSQX2831Z	GETTING STARTED	
A11	PSQW1776W	LEAFLET, VIEWNETCAM	
P1	PSPK2158Y	GIFT BOX	
P2	PSPN1161Z	ACCESSORY BOX (FOR ACCESSORIES)	
P3	PSPN1163Z	ACCESSORY BOX (FOR SET)	
P4	PSPD1231Z	CUTHION	
P5	PSPD1232Z	CUTHION	
P6	XZB20X30A05	PROTECTION COVER	
P7	XZB05X08A03	PROTECTION COVER (FOR SCREWS)	

20.3. MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1HCM280M	MAIN BOARD ASS'Y (RTL)	
		(ICS)	
IC101	C2DBYJ000009	IC	
IC102	PSWI1HCM280M	IC (ROM)	
IC103	C3ABPG000063	IC	
IC105	C0EBE0000231	IC	
IC106	B3NAA0000040	IC	
IC107	PQVIRT4543B	IC	
IC108	C0JBAN000171	IC	
IC110	C0EBC0000083	IC	
IC301	PFVIA2919SLB	IC	
IC351	B3NAA0000040	IC	
IC501	C1CB00001550	IC	
IC601	C1AB00001290	IC	
IC603	C0JBAB000568	IC	
IC701	C1AB00001649	IC	S
IC702	C3ABKG000113	IC	
IC703	C0JBAB000568	IC	
		(TRANSISTORS)	
Q106	PQVTDTC143E	TRANSISTOR(SI)	
Q503	PQVTDTC143E	TRANSISTOR(SI)	
Q666	B1GFCFJ00010	TRANSISTOR(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
		(DIODES)	
D101	MA741WK	DIODE(SI)	
D102	MA143A	DIODE(SI)	
D103	MA3082	DIODE(SI)	
D301	MA2Z72000	DIODE(SI)	
D302	MA2Z72000	DIODE(SI)	
D303	MA2Z72000	DIODE(SI)	
D304	MA2Z72000	DIODE(SI)	
		(COMPONENT PARTS)	
RA101	D1H81034A024	RESISTOR ARRAY	
RA102	D1H81034A024	RESISTOR ARRAY	
RA103	D1H84704A024	RESISTOR ARRAY	
RA104	D1H84704A024	RESISTOR ARRAY	
RA105	D1H84704A024	RESISTOR ARRAY	
RA106	D1H84704A024	RESISTOR ARRAY	
RA107	D1H84704A024	RESISTOR ARRAY	
RA108	D1H84704A024	RESISTOR ARRAY	
RA109	D1H84704A024	RESISTOR ARRAY	
RA110	D1H84704A024	RESISTOR ARRAY	
RA111	D1H84704A024	RESISTOR ARRAY	
RA112	D1H81034A024	RESISTOR ARRAY	
RA113	D1H81034A024	RESISTOR ARRAY	
RA115	D1H81034A024	RESISTOR ARRAY	
RA707	D1H84704A024	RESISTOR ARRAY	
		(CONNECTORS)	
CN301	K1KA04B00148	CONNECTOR, 4P	
CN305	K1MN17A00035	CONNECTOR, 17P	
CN601	K1MN21A00025	CONNECTOR, 21P	
CN603	K1KB60A00104	CONNECTOR, 60P	
		(CAPACITORS)	
C101	ECUE1H101JCQ	100p	S
C102	ECUE1H101JCQ	100p	S
C103	ECUE1H101JCQ	100p	S
C104	ECUE1H101JCQ	100p	S
C105	ECUE1H101JCQ	100p	S
C106	ECUE1H101JCQ	100p	S
C107	ECUE1C104ZFQ	0.1	S
C108	ECUE1C104ZFQ	0.1	S
C109	ECUE1H101JCQ	100p	S
C110	ECUE1C104ZFQ	0.1	S
C111	ECUE1H101JCQ	100p	S
C112	ECUE1H101JCQ	100p	S
C113	ECUE1C104ZFQ	0.1	S
C114	ECUE1H101JCQ	100p	S
C115	ECUE1H101JCQ	100p	S
C116	ECUE1H101JCQ	100p	S
C117	ECUE1H101JCQ	100p	S

Ref. No.	Part No.	Part Name & Description	Remarks
C118	ECUE1H101JCQ	100p	S
C119	ECUE1C104ZFQ	0.1	S
C120	ECUE1H101JCQ	100p	S
C122	F1K0J1060020	10	
C123	ECUE1H101JCQ	100p	S
C124	ECUE1C104ZFQ	0.1	S
C125	ECUE1C104ZFQ	0.1	S
C126	ECUE1C104ZFQ	0.1	S
C127	ECUE1C104ZFQ	0.1	S
C128	ECUE1C104ZFQ	0.1	S
C130	F1K0J1060020	10	
C132	ECUE1C104ZFQ	0.1	S
C133	ECUE1C104ZFQ	0.1	S
C134	ECUE1C104ZFQ	0.1	S
C135	ECUE1C104ZFQ	0.1	S
C136	ECUV1C224ZfV	0.22	S
C137	ECUV1C224ZfV	0.22	S
C138	ECUE1C104ZFQ	0.1	S
C139	ECUE1C104ZFQ	0.1	S
C140	ECUE1C104ZFQ	0.1	S
C141	ECUE1C104ZFQ	0.1	S
C142	ECUE1C104ZFQ	0.1	S
C143	ECUE1C104ZFQ	0.1	S
C144	ECUE1C104ZFQ	0.1	S
C145	ECUE1C104ZFQ	0.1	S
C147	ECUE1H471KBQ	470p	S
C148	ECUE1H471KBQ	470p	S
C149	ECUE1C104ZFQ	0.1	S
C150	ECUE1C104ZFQ	0.1	S
C152	ECUE1H330JCQ	33p	
C153	ECUE1H101JCQ	100p	S
C154	ECUE1H101JCQ	100p	S
C155	ECUE1C104ZFQ	0.1	S
C156	ECUE1C104ZFQ	0.1	S
C157	F1K0J1060020	10	
C158	F1K0J1060020	10	
C159	ECUE1C104ZFQ	0.1	S
C160	ECUE1C104ZFQ	0.1	S
C161	ECUE1C104ZFQ	0.1	S
C162	ECUE1C104ZFQ	0.1	S
C163	ECUE1C104ZFQ	0.1	S
C164	ECUE1C104ZFQ	0.1	S
C165	ECUE1C104ZFQ	0.1	S
C166	ECUE1C104ZFQ	0.1	S
C167	ECUE1C104ZFQ	0.1	S
C173	ECUE1C104ZFQ	0.1	S
C174	ECUV1A105ZFV	1	S
C175	ECUV1A105ZFV	1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C301	ECUE1H471KBQ	470p	S
C302	ECUE1H471KBQ	470p	S
C303	ECUV1A105ZFB	1	
C306	ECUE1C104ZFB	0.1	S
C307	ECUE1E472KBQ	0.0047	S
C308	ECUE1E472KBQ	0.0047	S
C309	F2G1C4700016	47	
C310	ECUE1H470JCQ	47p	S
C311	ECUE1H470JCQ	47p	S
C312	ECUE1H470JCQ	47p	S
C313	ECUE1H470JCQ	47p	S
C314	ECUV1A105ZFB	1	
C315	ECUE1H101JCQ	100p	S
C316	ECUE1H101JCQ	100p	S
C317	ECUE1H101JCQ	100p	S
C318	ECUE1H101JCQ	100p	S
C319	ECUE1H101JCQ	100p	S
C320	ECUE1H101JCQ	100p	S
C321	ECUE1H101JCQ	100p	S
C322	ECUE1H101JCQ	100p	S
C323	ECUE1H101JCQ	100p	S
C324	ECUE1H101JCQ	100p	S
C325	ECUE1C104ZFB	0.1	
C326	ECUE1H101JCQ	100p	S
C327	ECUE1H101JCQ	100p	S
C433	ECUE1H101JCQ	100p	S
C434	ECUE1H101JCQ	100p	S
C435	ECUE1H101JCQ	100p	S
C503	ECUE1H101JCQ	100p	S
C506	ECUE1H101JCQ	100p	S
C507	ECUE1H101JCQ	100p	S
C508	ECUE1H101JCQ	100p	S
C509	ECUE1H101JCQ	100p	S
C511	ECUE1H101JCQ	100p	S
C512	ECUE1H101JCQ	100p	S
C513	ECUE1H101JCQ	100p	S
C514	ECUE1H101JCQ	100p	S
C515	ECUE1H101JCQ	100p	S
C516	ECUE1H101JCQ	100p	S
C517	F1K0J1060020	10	
C518	ECUE1H101JCQ	100p	S
C520	ECUV1E103KBV	0.01	
C522	F1K0J1060020	10	
C523	F1K0J1060020	10	
C524	ECUE1C104ZFB	0.1	S
C525	ECUE1C104ZFB	0.1	S
C526	ECUE1C104ZFB	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C528	ECUE1C104ZFQ	0.1	S
C529	ECUE1C104ZFQ	0.1	S
C530	ECUE1H150JCQ	15p	S
C531	ECUE1H180JCQ	18p	S
C533	ECUE1C104ZFQ	0.1	S
C534	ECUE1C104ZFQ	0.1	S
C535	ECUE1C104ZFQ	0.1	S
C536	ECUE1C104ZFQ	0.1	S
C537	ECUE1C104ZFQ	0.1	S
C538	ECUE1C104ZFQ	0.1	S
C539	ECUE1C104ZFQ	0.1	S
C540	ECUE1C104ZFQ	0.1	S
C541	ECUE1C104ZFQ	0.1	S
C550	ECUE1H330JCQ	33p	S
C601	ECUV0J105KBV	1	
C602	ECUV0J105KBV	1	
C603	ECUE1H221JCQ	220p	S
C604	ECUE1H221JCQ	220p	S
C605	F1K0J1060020	10	
C606	ECUE1H101JCQ	100p	S
C607	ECUE1H101JCQ	100p	S
C608	F1K0J1060020	10	
C609	ECUE1C104ZFQ	0.1	S
C610	F1K0J1060020	10	
C611	F1K0J1060020	10	
C612	ECUE1C104ZFQ	0.1	S
C613	F1K0J1060020	10	
C614	ECUV1A105ZFY	1	
C615	ECUV1A105ZFY	1	
C616	ECUE1H101JCQ	100p	S
C617	ECUE1C104ZFQ	0.1	S
C618	ECUE1H101JCQ	100p	S
C619	ECUE1C104ZFQ	0.1	S
C620	ECUE1C104ZFQ	0.1	S
C621	F1K0J1060020	10	
C622	ECUE1H100DCQ	10p	S
C623	ECUE1H100DCQ	10p	S
C624	ECUE1H101JCQ	100p	
C625	ECUE1H330JCQ	33p	S
C626	ECUE1C104ZFQ	0.1	S
C627	ECUE1C104ZFQ	0.1	S
C628	ECUE1H101JCQ	100p	S
C629	F1K0J1060020	10	
C630	ECUE1C104ZFQ	0.1	S
C631	ECUE1H101JCQ	100p	S
C632	ECUE1H330JCQ	33p	S
C633	ECUE1H101JCQ	100p	S

Ref. No.	Part No.	Part Name & Description	Remarks
C634	ECUE1C104ZFQ	0.1	S
C635	ECUE1C104ZFQ	0.1	S
C636	ECUE1H101JCQ	100p	S
C637	ECUE1C104ZFQ	0.1	S
C638	ECUE1C104ZFQ	0.1	S
C639	ECUE1C104ZFQ	0.1	S
C640	ECUE1C104ZFQ	0.1	S
C641	ECUE1C104ZFQ	0.1	S
C644	PFCX1EY106ZF	10	
C651	ECUE1C104ZFQ	0.1	S
C652	ECUE1C104ZFQ	0.1	S
C653	ECUE1C104ZFQ	0.1	S
C654	ECUE1C104ZFQ	0.1	S
C655	ECUE1C104ZFQ	0.1	S
C656	ECUE1H101JCQ	100p	S
C657	ECUE1H101JCQ	100p	S
C658	ECUE1H101JCQ	100p	S
C659	ECUE1H101JCQ	100p	S
C660	ECUE1H101JCQ	100p	S
C661	ECUE1C104ZFQ	0.1	S
C663	ECUE1C104ZFQ	0.1	S
C664	ECUE1C104ZFQ	0.1	S
C665	ECUE1C104ZFQ	0.1	S
C666	ECUE1C104ZFQ	0.1	S
C667	ECUE1C104ZFQ	0.1	S
C668	ECUE1C104ZFQ	0.1	S
C669	ECUE1C104ZFQ	0.1	S
C670	ECUE1C104ZFQ	0.1	S
C671	ECUE1H101JCQ	100p	S
C672	ECUE1H101JCQ	100p	S
C673	ECUE1H101JCQ	100p	S
C674	ECUE1H101JCQ	100p	S
C675	ECUE1H101JCQ	100p	S
C676	ECUE1H101JCQ	100p	S
C677	ECUE1C104ZFQ	0.1	S
C678	ECUE1H101JCQ	100p	S
C679	ECUE1H101JCQ	100p	S
C680	F1K0J1060020	10	
C701	ECUE1C104ZFQ	0.1	S
C702	ECUE1C104ZFQ	0.1	S
C703	ECUE1C104ZFQ	0.1	S
C704	ECUE1C104ZFQ	0.1	S
C705	ECUE1C104ZFQ	0.1	S
C706	ECUE1C104ZFQ	0.1	S
C707	ECUE1C104ZFQ	0.1	S
C708	ECUE1C104ZFQ	0.1	S
C709	ECUE1C104ZFQ	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C710	ECUE1C104ZFQ	0.1	S
C711	ECUE1C104ZFQ	0.1	S
C712	ECUE1C104ZFQ	0.1	S
C713	ECUE1C104ZFQ	0.1	S
C714	ECUE1H150JCQ	15p	S
C715	ECUE1H150JCQ	15p	S
C716	ECUE1H330JCQ	33p	S
		(RESISITORS)	
R101	ERJ2GEYJ103	10k	S
R103	ERJ2GEYJ103	10k	S
R104	ERJ2GEYJ103	10k	S
R107	ERJ2GEJ470	47	S
R109	ERJ2GEYJ103	10k	S
R112	ERJ2GEYJ103	10k	S
R115	ERJ2GEYJ103	10k	S
R117	ERJ2GEYJ103	10k	S
R119	D0GA330JA004	33	S
R120	D0GA330JA004	33	S
R121	ERJ2GEYJ103	10k	S
R122	ERJ2GEYJ152	1.5k	S
R123	ERJ2GEYJ152	1.5k	S
R124	ERJ2GEYJ103	10k	S
R125	ERJ2GEYJ103	10k	S
R126	ERJ2GEJ471	470	S
R127	ERJ2GEJ470	47	S
R129	ERJ2GEJ470	47	S
R130	ERJ2GEJ470	47	S
R131	ERJ2GEJ470	47	S
R133	ERJ2GEJ470	47	S
R134	ERJ2GEJ470	47	S
R135	ERJ2GEJ470	47	S
R138	ERJ2GEJ470	47	S
R139	ERJ2GEJ470	47	S
R140	ERJ2GEJ470	47	S
R141	ERJ2GEJ470	47	S
R147	ERJ2GEYJ103	10k	S
R148	ERJ2GEJ000	0	S
R149	ERJ2GEYJ103	10k	S
R150	ERJ2GEYJ103	10k	S
R151	ERJ2GEYJ103	10k	S
R163	ERJ3GEYJ101	100	
R164	ERJ2GEYJ103	10k	S
R165	ERJ3GEYJ101	100	
R167	ERJ3GEYJ272	2.7k	
R168	ERJ3GEYJ101	100	
R172	ERJ2GEYJ103	10k	S

Ref. No.	Part No.	Part Name & Description	Remarks
R173	ERJ2GEYJ103	10k	S
R174	ERJ2GEYJ103	10k	S
R175	ERJ2GEYJ103	10k	S
R181	ERJ2GEYJ102	1k	S
R182	ERJ3GEYJ332	3.3k	
R301	ERJ2GEJ563	56k	S
R302	ERJ2GEYJ103	10k	S
R303	ERJ2GEJ563	56k	S
R304	ERJ2GEYJ103	10k	S
R305	ERJ2GEYJ102	1k	S
R306	ERJ2GEYJ102	1k	S
R307	ERJ14BQF1R5	1.5	
R308	ERJ14BQF1R5	1.5	
R315	ERJ2GEJ101	100	S
R316	ERJ2GEJ101	100	S
R317	ERJ2GEJ101	100	S
R318	ERJ2GEJ101	100	S
R319	ERJ2GEJ101	100	S
R320	ERJ2GEJ101	100	S
R321	ERJ2GEJ101	100	S
R322	ERJ2GEJ101	100	S
R323	ERJ2GEJ101	100	S
R324	ERJ2GEJ101	100	S
R391	ERJ2GEYJ103	10k	S
R392	ERJ2GEYJ103	10k	S
R393	ERJ2GEYJ103	10k	S
R394	ERJ2GEYJ103	10k	S
R395	ERJ2GEYJ103	10k	S
R504	ERJ3EKF24R9	24.9	S
R505	ERJ3EKF24R9	24.9	S
R506	ERJ3EKF24R9	24.9	S
R507	ERJ3EKF24R9	24.9	S
R508	ERJ3EKF49R9	49.9	S
R509	ERJ3EKF49R9	49.9	S
R513	ERJ3EKF1102	11k	S
R514	ERJ2GEYJ103	10k	S
R515	ERJ2GEYJ103	10k	S
R517	ERJ2GEJ101	100	S
R519	ERJ2GEYJ103	10k	S
R521	ERJ2GEYJ103	10k	S
R522	ERJ2GEYJ103	10k	S
R531	J0JDC0000040	CHIP BEED	
R532	J0JDC0000040	CHIP BEED	
R533	D0GA330JA004	33	S

Ref. No.	Part No.	Part Name & Description	Remarks
R601	ERJ2GEJ000	0	S
R602	ERJ2GEJ000	0	S
R605	ERJ2GEYJ152	1.5k	S
R606	ERJ2GEJ822	8.2k	S
R607	ERJ2GEJ101	100	S
R608	ERJ2GEJ101	100	S
R609	PQ4R10XJ330	33	
R610	ERJ2GEJ105X	1M	S
R611	ERJ2GEJ000	0	S
R612	ERJ2GEYJ103	10k	S
R613	ERJ2GEYJ103	10k	S
R615	ERJ2GEYJ103	10k	S
R616	ERJ2GEYJ103	10k	S
R617	ERJ2GEYJ103	10k	S
R618	ERJ2GEYJ103	10k	S
R620	ERJ2GEYJ103	10k	S
R621	PQ4R10XJ470	47	
R622	ERJ2GEJ000	0	S
R623	ERJ2GEJ000	0	S
R624	ERJ2GEJ000	0	S
R632	ERJ2GEJ101	100	S
R633	ERJ2GEJ101	100	S
R635	ERJ2GEJ101	100	S
R636	ERJ2GEJ101	100	S
R637	ERJ2GEJ101	100	S
R638	ERJ2GEJ101	100	S
R639	ERJ2GEJ101	100	S
R640	ERJ2GEYJ222	2.2k	S
R698	ERJ2GEJ101	100	S
R699	ERJ2GEYJ103	10k	S
R701	ERJ2GEYJ103	10k	S
R702	D0GA330JA004	33	S
R703	ERJ2GEJ000	0	S
R704	ERJ2GEJ105X	1M	S
R706	ERJ2GEJ470	47	S
R707	ERJ2GEJ101	100	S
		(COILS)	
L103	PQLQR2R100	COIL	
L301	G1C100KA0046	COIL	
L502	PQLQR2R100	COIL	
L601	PQLQR2R100	COIL	
L602	PQLQR2R100	COIL	
		(SWITCH)	
SW101	K0H1BA000401	SWITCH	
		(CRYSTAL OSCILLATORS)	

Ref. No.	Part No.	Part Name & Description	Remarks
X501	H0J250500026	CRYSTAL OSCILLATOR	
X601	H0J245500045	CRYSTAL OSCILLATOR	
X701	H0J166500005	CRYSTAL OSCILLATOR	
		(OTHER)	
E1	PSMC1110Z	MAGNETIC SHIELD, SHIELD SHEET	
E2	PSHR1290Z	SPACER	ABS-V0

20.4. TILT BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2HCM180N	TILT BOARD ASS'Y (RTL)	
		(ICS)	
IC81	C0DBAZH00009	IC	
IC352	PFVIA2919SLB	IC	
IC602	C0CBADD00009	IC	
		(TRANSISTORS)	
Q81	B1DHCD000018	TRANSISTOR(SI)	
Q99	B1DHAC000002	TRANSISTOR(SI)	
Q351	PQVTDTC143E	TRANSISTOR(SI)	
		(DIODES)	
D54	MA736	DIODE(SI)	
D351	MA2Z72000	DIODE(SI)	
D352	MA2Z72000	DIODE(SI)	
D353	MA2Z72000	DIODE(SI)	
D354	MA2Z72000	DIODE(SI)	
		(CONNECTORS)	
CN351	K1MN17A00035	CONNECTOR, 17P	
CN353	K1KA04B00148	CONNECTOR, 4P	
CN361	K1MN21A00025	CONNECTOR, 21P	
CN371	K1MN21B00061	CONNECTOR, 21P	
		(CAPACITORS)	
C81	ECUV1E104ZFY	0.1	
C82	ECUV1H220JCV	22p	
C83	ECUV1H331JCV	330p	
C84	PFCX1EY106ZF	10	
C85	PFCX1EY106ZF	10	
C86	F4Z0K3360001	33	
C87	ECUV1E104ZFY	0.1	
C88	ECUV1H221JCV	220p	
C351	ECUV1C105ZFX	1	S
C352	ECUV1A105ZFY	1	
C353	ECUV1A105ZFY	1	
C354	ECUV1H471JCV	470p	
C355	ECUV1H471JCV	470p	
C356	ECUV1E104ZFY	0.1	
C359	ECUV1E104ZFY	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C360	ECUV1H472KBV	0.0047	
C361	ECUV1H472KBV	0.0047	
C362	ECUV1H470JCV	47p	
C363	ECUV1H470JCV	47p	
C364	ECUV1H470JCV	47p	
C365	ECUV1H470JCV	47p	
C366	ECUE1H101JCQ	100p	S
C367	ECUE1C104ZFQ	0.1	S
C368	ECUE1H101JCQ	100p	S
C410	F2G1C4700016	47	
C645	ECUV1E104ZFY	0.1	
C646	F1K0J1060020	10	
		(RESISTORS)	
R81	ERJ3EKF6803	68k	S
R82	ERJ3EKF1133	113k	S
R83	ERJ14BSFR10	0.1	
R85	ERJ3GEYJ682	6.8k	
R87	ERJ3GEYJ684	680k	
R90	ERJ3GEY0R00	0	
R99	ERJ3GEYJ563	56k	
R351	ERJ3GEYJ223	22k	
R352	ERJ3GEYJ333	33k	
R353	ERJ3GEYJ153	15k	
R354	ERJ3GEYJ101	100	
R355	ERJ3GEYJ101	100	
R356	ERJ3GEYJ563	56k	
R357	ERJ3GEYJ563	56k	
R358	ERJ3GEYJ102	1k	
R359	ERJ3GEYJ102	1k	
R360	ERJ14BQF1R5	1.5	
R361	ERJ14BQF1R5	1.5	
R371	ERJ3GEYJ101	100	
R372	ERJ3GEYJ101	100	
		(COILS)	
L81	G1C470ZA0012	COIL	
L351	G1C100KA0046	COIL	
L352	J0JCC0000192	COIL	
L353	J0JCC0000192	COIL	
L354	J0JCC0000192	COIL	
L355	J0JCC0000192	COIL	
L356	G1C100KA0046	COIL	

20.5. LENS BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PSWP3HCM180N	LENS BOARD ASS'Y (RTL)	
		(ICS)	
IC1001	C0GBB0000016	IC	S
IC1002	C0GBB0000016	IC	S
IC1007	C0ABBA000041	IC	
IC1008	C0FBB000102	IC	
IC1010	C0ABBB000105	IC	
IC1011	C0CBADC00044	IC	
		(TRANSISTORS)	
Q1001	2SD601A	TRANSISTOR(SI)	S
Q1002	UN9211	TRANSISTOR(SI)	
Q1003	B1HDGFA00001	TRANSISTOR(SI)	
Q1004	B1HDGFA00001	TRANSISTOR(SI)	
Q1005	B1HDGFA00001	TRANSISTOR(SI)	
Q1006	B1HDGFA00001	TRANSISTOR(SI)	
Q1007	PQVTDTC143E	TRANSISTOR(SI)	
Q1008	PQVTDTC143E	TRANSISTOR(SI)	
		(DIODES)	
LED1001	B3AGB0000039	LED	
		(CONNECTORS)	
CN1001	K1MN21B00061	CONNECTOR, 21P	
CN1002	K1MN18B00100	CONNECTOR, 18P	
		(CAPACITORS)	
C1001	ECUV1A105ZFV	1	
C1002	ECUV1A105ZFV	1	
C1003	ECUV1A105ZFV	1	
C1004	ECUV1C104ZFV	0.1	
C1005	ECUV1C104ZFV	0.1	
C1006	ECUV1A105ZFV	1	
C1007	ECST0JY106	10	S
C1008	ECUV1C104ZFV	0.1	
C1010	ECUV1C104ZFV	0.1	
C1011	ECUV1H332KBV	0.0033	
C1012	ECUV1A105ZFV	1	
C1013	ECUV1H332KBV	0.0033	
C1014	ECUV1C104ZFV	0.1	
C1015	ECST0JY106	10	S
C1016	ECUV1C104ZFV	0.1	
C1017	ECUV1C104ZFV	0.1	
C1018	ECST1AC476R	47	
C1020	ECUV1C104ZFV	0.1	
C1021	ECUV1C104ZFV	0.1	
C1023	ECUV1A105ZFV	1	
C1024	ECUV1C224KBV	0.22	
C1025	ECUV1C104ZFV	0.1	
C1026	ECUV1C104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C1027	ECUV1H102KBV	0.001	
C1028	ECUV1H222KBV	0.0022	
C1029	PQCUV1A105KB	1	
C1030	ECUV1C104ZV	0.1	
C1031	ECUV1C104ZV	0.1	
C1032	ECUV1C104KBV	0.1	
C1034	ECUV1A105ZV	1	
C1035	ECUV1A105ZV	1	
C1036	ECUV1A105ZV	1	
		(RESOSTPRS)	
R1001	ERJ3GEYJ473	47k	
R1002	ERJ3GEYJ473	47k	
R1003	ERJ3GEYJ3R3	3.3	
R1004	ERJ3GEYJ3R3	3.3	
R1005	ERJ3GEYJ3R3	3.3	
R1006	ERJ3GEYJ3R3	3.3	
R1007	ERJ3GEYJ102	1k	
R1008	ERJ3GEYJ471	470	
R1009	ERJ3GEYJ101	100	
R1010	ERJ3GEYJ123	12k	
R1011	ERJ3GEYJ123	12k	
R1012	ERJ3GEYJ183	18k	
R1013	ERJ3EKF6802	68k	S
R1014	ERJ3GEYJ682	6.8k	
R1015	ERJ3EKF3302	33k	S
R1016	ERJ3GEYJ223	22k	
R1017	ERJ3GEYJ223	22k	
R1018	ERJ3GEYJ152	1.5k	
R1019	ERJ3GEYJ684	680k	
R1021	ERJ3GEYJ103	10k	
R1022	ERJ3GEYJ104	100k	
R1023	ERJ3GEYJ474	470k	
R1024	ERJ3GEYJ273	27k	
R1025	ERJ3GEYJ333	33k	
R1026	ERJ3EKF6801	6.8k	S
R1027	ERJ3GEYJ684	680k	
R1028	ERJ3GEYJ103	10k	
R1029	ERJ3GEYJ102	1k	
R1030	ERJ3GEYJ103	10k	
R1031	ERJ3GEYJ472	4.7k	
R1032	ERJ3GEYJ154	150k	
R1033	ERJ3GEYJ472	4.7k	
R1034	ERJ3GEYJ102	1k	
R1035	ERJ3GEYJ151	150	
R1036	ERJ3GEYJ683	68k	
R1037	ERJ3GEYJ151	150	
		(COILS)	
L1001	ELJFC6R8KF	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L1002	ELJFC6R8KF	COIL	
L1003	ELJPA100KF	COIL	

20.6. VIDEO BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PSWP4HCM180N	VIDEO BOARD ASS'Y (RTL)	
		(ICS)	
IC801	C1AB00001761	IC	
IC802	UPD16510GR	IC	
IC803	C1AB00001347	IC	
IC804	C1AB00001606	IC	
IC805	C0JBAB000567	IC	
IC902	PSWI2HCM280M	IC	
IC1152	PQVIC68B102M	IC	
IC1153	C0DBAGC00014	IC	
		(TRANSISTORS)	
Q801	2SB1218A	TRANSISTOR(SI)	
Q802	2SB1218A	TRANSISTOR(SI)	
Q803	2SC4081R	TRANSISTOR(SI)	
Q804	2SC4081R	TRANSISTOR(SI)	
Q1151	2SB1218A	TRANSISTOR(SI)	
Q1152	B1CFMD000004	TRANSISTOR(SI)	
Q1153	B1DHAC000002	TRANSISTOR(SI)	
		(DIODES)	
D801	MA111	DIODE(SI)	
D1151	MA720	DIODE(SI)	
D1152	MA720	DIODE(SI)	
D1153	MA720	DIODE(SI)	
D1154	MA736	DIODE(SI)	
D1155	MA111	DIODE(SI)	
D1156	MA3051	DIODE(SI)	
DA901	MA133	DIODE(SI)	
		(COMPONENT COMBINATIONS)	
RA801	D1H83304A024	33	
RA802	D1H83304A024	33	
		(CONNECTORS)	
CN801	K1MN21B00061	CONNECTOR, 21P	
CN902	K1MN21B00061	CONNECTOR, 21P	
CN904	K1MN21B00061	CONNECTOR, 21P	
		(CAPACITORS)	
C801	ECUE1E472KBQ	0.0047	S

Ref. No.	Part No.	Part Name & Description	Remarks
C802	ECUE1E472KBQ	0.0047	S
C803	ECUV1E104ZFB	0.1	
C804	ECUE1C104ZFB	0.1	S
C805	ECUE1C104ZFB	0.1	S
C806	ECUE1C104ZFB	0.1	S
C807	PQCUV1C105KB	1	S
C808	ECST0JY226	22	S
C809	ECUE1C223KBQ	0.022	S
C810	ECUV0J105KBV	1	S
C811	ECUE1C104ZFB	0.1	S
C812	ECUE1C104ZFB	0.1	S
C813	ECUE1C104ZFB	0.1	S
C814	ECUE1C104ZFB	0.1	S
C815	ECUV1E105KB	1	S
C816	ECUE1C104ZFB	0.1	S
C817	ECUE1C104ZFB	0.1	S
C818	ECUV1C105ZFB	1	S
C819	ECUE1C104ZFB	0.1	S
C820	F1J1A3350001	3.3	S
C821	ECUE1C104ZFB	0.1	S
C822	ECUE1C104ZFB	0.1	S
C823	ECST0JY106	10	
C824	ECUE1C104ZFB	0.1	S
C825	ECUE1C104ZFB	0.1	S
C826	ECUE1C104ZFB	0.1	S
C827	ECUE1C104ZFB	0.1	S
C828	ECST0JY226	22	S
C829	ECUE1C104ZFB	0.1	S
C830	ECUE1C104ZFB	0.1	S
C831	ECUE1C104ZFB	0.1	S
C832	ECUE1H150JCQ	15p	S
C833	ECUE1H150JCQ	15p	S
C834	ECUE1C104ZFB	0.1	S
C835	ECUE1C104ZFB	0.1	S
C836	ECUE1C104ZFB	0.1	S
C837	F1H0G4750001	4.7	
C838	F1H0G4750001	4.7	
C839	ECUV1A105ZFB	1	
C840	ECUE1C104ZFB	0.1	S
C841	ECUE1C104ZFB	0.1	S
C842	ECUE1C104ZFB	0.1	S
C843	ECST0JX476	47	S
C844	ECUE1C104ZFB	0.1	S
C845	ECST0JX336	33	S
C846	ECUE1H820JCQ	82p	S
C847	ECST0JX476	47	S
C851	ECUV0J105KBV	1	S
C852	ECUE1A104KBQ	0.1	S
C854	ECUE1C104ZFB	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C855	ECST1AX226	22	S
C901	ECUV1A105ZV	1	
C902	ECUV1A105ZV	1	
C903	ECUE1H101JCQ	100p	S
C904	ECUV1A105ZV	1	
C905	ECUE1H101JCQ	100p	S
C906	ECUV1C105ZFX	1	S
C907	ECUE1H101JCQ	100p	S
C908	ECUV1A105ZV	1	
C909	ECUE1H101JCQ	100p	S
C910	ECUE1H101JCQ	100p	S
C911	ECUE1H101JCQ	100p	S
C912	ECUE1H101JCQ	100p	S
C913	ECUE1H101JCQ	100p	S
C914	ECUE1H150JCQ	15p	S
C915	ECUE1H150JCQ	15p	S
C916	ECUE1C104ZFY	0.1	S
C917	ECST0JY226	22	S
C918	ECUE1C104ZFY	0.1	S
C919	ECUE1C104ZFY	0.1	S
C920	ECUE1C104ZFY	0.1	S
C921	ECST1AX226	22	S
C922	ECUE1C104ZFY	0.1	S
C923	PQCUV1A105KB	1	S
C924	ECUE1H101JCQ	100p	S
C925	ECUE1H101JCQ	100p	S
C926	ECUE1H101JCQ	100p	S
C927	ECUE1H101JCQ	100p	S
C928	ECUE1H101JCQ	100p	S
C929	ECUE1H101JCQ	100p	S
C930	ECUE1H101JCQ	100p	S
C931	ECUV1A105ZV	1	
C932	ECUE1H101JCQ	100p	S
C933	ECUV1A105ZV	1	
C934	ECUE1H101JCQ	100p	S
C935	ECUE1H101JCQ	100p	S
C936	ECUE1H101JCQ	100p	S
C937	ECUV1A105ZV	1	
C938	ECUE1H101JCQ	100p	S
C939	ECUE1H101JCQ	100p	S
C940	ECUE1H101JCQ	100p	S
C941	ECUE1H101JCQ	100p	S
C942	ECUE1C104ZFY	0.1	S
C1151	ECUE1C104ZFY	0.1	S
C1152	ECST1AX226	22	S
C1153	F1K1C475A043	4.7	S
C1157	F1K1C475A043	4.7	S
C1158	ECUE1C104ZFY	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C1159	F1K1C475A043	4.7	S
C1160	ECUE1C104ZFQ	0.1	S
C1161	ECUE1H151JCQ	150p	S
C1162	F1K1C475A043	4.7	S
C1163	F4Z0J4760001	47	S
C1164	ECUE1C104ZFQ	0.1	S
C1165	ECUE1C104ZFQ	0.1	S
C1166	ECUE1C104ZFQ	0.1	S
C1167	F1K1C475A043	4.7	S
C1168	F1K0J1060020	10	
C1169	ECUE1C104ZFQ	0.1	S
C1170	ECUV1C225KB	2.2	
		(RESISITORS)	
R801	ERJ2GEJ333	33k	S
R802	ERJ2GEJ104	100k	S
R804	ERJ2GE0R00	0	S
R806	ERJ2GE0R00	0	S
R807	ERJ2GE0R00	0	S
R808	ERJ2GE0R00	0	S
R809	ERJ2GEJ330	33	S
R810	ERJ2GEJ330	33	S
R812	PSLQR2K060H	CERAMIC FILTER	S
R813	J0JCC0000002	CERAMIC FILTER	S
R814	ERJ2GEJ101	100	S
R815	ERJ2GEJ101	100	S
R816	ERJ2GEJ101	100	S
R817	PSLQR2K060H	CERAMIC FILTER	S
R818	ERJ2GE0R00	0	S
R819	ERJ2GEJ101	100	S
R820	ERJ2GE0R00	0	S
R821	ERJ2GE0R00	0	S
R822	ERJ2GE0R00	0	S
R823	ERJ2GE0R00	0	S
R824	ERJ2GE0R00	0	S
R825	ERJ2GE0R00	0	S
R826	ERJ2GEJ104	100k	S
R827	ERJ2GEJ101	100	S
R828	ERJ2GEJ330	33	S
R829	ERJ2GEJ330	33	S
R830	ERJ2GEJ330	33	S
R831	ERJ2GEJ105X	1M	S
R832	ERJ2GEYJ561	560	S
R833	ERJ2GEYJ103	10k	S
R834	ERJ3EKF3901	3.9k	S
R835	ERJ2GEJ823	82k	S
R837	ERJ3EKF3300	3.3k	S
R838	ERJ3GEYF562	5.6k	S
R839	ERJ3GEYF122	1.2k	S

Ref. No.	Part No.	Part Name & Description	Remarks
R840	ERJ2GEYF102	1k	S
R841	ERJ2GEYF391	390	S
R842	ERJ2GEYF391	390	S
R843	ERJ2GEYJ102	1k	S
R845	ERJ2GEYF102	1k	S
R846	ERJ2GEYF102	1k	S
R847	ERJ2GEYF391	390	S
R848	ERJ2GEYF391	390	S
R849	ERJ2GEYJ102	1k	S
R850	ERJ2GEYF102	1k	S
R901	ERJ3GEY0R00	0	
R902	ERJ3GEY0R00	0	
R903	ERJ3GEY0R00	0	
R904	ERJ2GEJ330	33	S
R905	ERJ2GEJ330	33	S
R906	ERJ2GEYJ103	10k	S
R907	ERJ2GEYJ103	10k	S
R908	ERJ2GEYJ103	10k	S
R909	ERJ2GEYJ103	10k	S
R910	ERJ2GEJ330	33	S
R911	ERJ2GEJ330	33	S
R912	ERJ2GEJ330	33	S
R913	ERJ2GE0R00	0	S
R914	ERJ2GEJ330	33	S
R915	ERJ2GEJ330	33	S
R916	ERJ2GEJ330	33	S
R918	ERJ2GEYJ103	10k	S
R919	ERJ2GEYJ103	10k	S
R921	ERJ2GEYJ103	10k	S
R922	ERJ2GEYJ103	10k	S
R923	ERJ2GE0R00	0	S
R924	ERJ2GEYJ103	10k	S
R925	ERJ2GEYJ103	10k	S
R926	ERJ2GEYJ103	10k	S
R927	ERJ2GEYJ103	10k	S
R928	ERJ2GEYJ103	10k	S
R929	ERJ2GEJ330	33	S
R930	ERJ2GEJ330	33	S
R931	ERJ2GEJ330	33	S
R932	ERJ2GEYJ103	10k	S
R933	ERJ3EKF5602	56k	S
R934	ERJ2GEYJ103	10k	S
R935	ERJ2GEJ330	33	S
R936	ERJ2GEJ330	33	S
R937	ERJ2GEJ330	33	S
R938	ERJ2GEYJ103	10k	S
R939	ERJ2GEJ330	33	S

Ref. No.	Part No.	Part Name & Description	Remarks
R940	ERJ2GEJ330	33	S
R941	ERJ2GEJ330	33	S
R942	ERJ2GEJ330	33	S
R943	ERJ2GEJ471	470	S
R944	ERJ2GEJ330	33	S
R1153	ERJ3EKF1103	11k	S
R1154	ERJ3EKF1002	10k	S
R1155	ERJ2GEYJ152	1.5k	S
R1156	ERJ2GEYF102	1k	S
R1157	ERJ2GEYJ103	10k	S
		(COILS&FILTERS)	
L801	PSLQR1T100K	COIL	
L802	PSLQR1T100K	COIL	
L803	PSLQR1T100K	COIL	
L804	PSLQR1T100K	COIL	
L807	PSLQR1T100K	COIL	
L808	630LMN1028	CERAMIC FILTER	
L809	628BIN1010	CERAMIC FILTER	
L1151	G1C150K00006	COIL	
L1152	PSLQR2D221M	COIL	
L1153	G1C100ZA0012	COIL	
L1154	ELJFC220KF	COIL	
L1155	ELJFC220KF	COIL	
L1156	PQLQR2R100	COIL	
		(CRYSTAL OSCILLATORS)	
X801	PSVCC0006D	CRYSTAL OSCILLATOR	
X901	PSVCC0031GT	CRYSTAL OSCILLATOR	

20.7. CCD UNIT PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PSWP5HCM280M	CCD BOARD ASS'Y (RTL)	
		(TRANSISTOR)	
Q1101	B1ABAD000004	TRANSISTOR(SI)	
		(CONNECTOR)	
CN1101	K1MN21B00061	CONNECTOR	
		(CAPACITORS)	
C1101	ECUV1E104ZV	0.1	
C1102	ECUV1H102KBV	0.001	
C1103	ECUV1H222KBV	0.0022	
C1104	F1K1C475A043	4.7	
C1105	ECUV1H103KBV	0.01	
C1106	F1K1C475A043	4.7	S
C1107	ECUV1H472KBV	0.0047	
		(RESISTORS)	
R1102	ERJ3GEYJ105	1M	
R1103	ERJ3GEYJ472	4.7k	
R1104	ERJ3GEY0R00	0	
R1105	ERJ3GEY0R00	0	
R1106	ERJ3GEYJ151	150	
		(COIL)	
L1101	PSLQR1T100K	COIL	

20.8. I/O BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PSWP6HCM180N	I/O BOARD ASS'Y (RTL)	
		(ICS)	
IC21	C0DBAZH00009	IC	
IC51	C0DBAZH00009	IC	
		(TRANSISTORS)	
Q10	PQVTDTC143E	TRANSISTOR(SI)	
Q11	PQVTDTA143EU	TRANSISTOR(SI)	
Q21	B1DHCD000018	TRANSISTOR(SI)	
Q51	B1DHCD000018	TRANSISTOR(SI)	
		(DIODES)	
D1	MA736	DIODE(SI)	
D51	MA736	DIODE(SI)	
D52	MA736	DIODE(SI)	
DA11	MA143A	DIODE(SI)	
DA12	MA143A	DIODE(SI)	
DA501	MA143A	DIODE(SI)	
DA502	MA143A	DIODE(SI)	

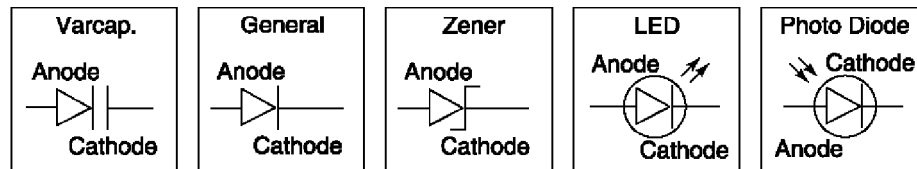
Ref. No.	Part No.	Part Name & Description	Remarks
DA503	MA143A	DIODE(SI)	
DA504	MA143A	DIODE(SI)	
		(JACK AND CONNECTORS)	
CN1	PFJJ1B01Z	CONNECTOR, PLUG	
CN5	N5HBZ0000010	CONNECTOR, 8P	
CN6	K2HC103B0061	JACK, VIEDO	
CN11	K4BC04B00035	CONNECTOR, 4P	
CN501	K1KB60A00038	CONNECTOR, 60P	
		(CAPACITORS)	
C1	F2A1C4720026	4700	
C13	ECUV1E104ZFV	0.1	
C14	ECUV1H471JCV	470P	
C15	ECUV1E104ZFV	0.1	
C16	ECUV1E104ZFV	0.1	
C17	ECUV1H471JCV	470P	
C20	ECUV1H221JCV	220P	
C21	ECUV1C224ZFV	0.22	
C22	ECUV1H560JCV	56P	
C23	PFCX1EY106ZF	10	
C24	PFCX1EY106ZF	10	
C25	F4Z0J4760001	47	
C26	ECUV1E104ZFV	0.1	
C27	F1K0J1060020	10	
C31	ECUV1H471JCV	470P	
C34	ECUV1E104ZFV	0.1	
C35	ECUV1E104ZFV	0.1	
C36	ECUV1E104ZFV	0.1	
C37	ECUV1E104ZFV	0.1	
C43	ECUV1E104ZFV	0.1	
C44	ECUV1E104ZFV	0.1	
C45	ECUV1E104ZFV	0.1	
C46	ECUV1E104ZFV	0.1	
C47	ECUV1E104ZFV	0.1	
C48	ECUV1E104ZFV	0.1	
C51	PFCX1EY106ZF	10	
C52	F4Z0J4760001	47	
C53	ECUV1E104ZFV	0.1	
C54	F1K0J1060020	10	
C55	PFCX1EY106ZF	10	
C56	ECUV1C224ZFV	0.22	
C57	ECUV1H471JCV	470P	
C58	ECUV1H271KBV	270P	
C59	ECUV1H560JCV	56P	
C89	ECUV1H102KBV	0.001	
C90	ECUV1E104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C91	ECUV1E104ZFV	0.1	
C504	ECUV1E104ZFV	0.1	
		(RESISITORS)	
R1	ERJ3GEYJ122	1.2k	
R6	ERJ8GEYJ750	75	
R7	D4ZZ00000024	VARISTOR	
R21	ERJ3EKF2703	270k	S
R22	ERJ3EKF1003	100k	S
R23	ERJ14BSFR10	0.1	
R25	ERJ3GEYJ244	240k	
R27	ERJ3GEYJ682	6.8k	
R28	ERJ3GEY0R00	0	
R51	ERJ3EKF2703	27k	S
R52	ERJ3EKF2703	27k	S
R53	ERJ14BSFR10	0.1	
R54	ERJ3GEYJ244	240k	
R55	ERJ3GEYJ153	15k	
R56	ERJ3GEY0R00	0	
R88	ERJ3GEYJ101	100	
R89	ERJ3GEYJ103	10k	
R503	ERJ3GEY0R00	0	
R512	ERJ3GEY0R00	0	
		(COILS&FILTERS)	
L1	G0B150G00001	COIL	
L2	G1C6R8MA0053	COIL	
L11	PSLQR2K060H	CERAMIC FILTER	
L12	PSLQR2K060H	CERAMIC FILTER	
L21	G1C220ZA0011	COIL	
L22	G1C100KA0046	COIL	
L51	G1C470ZA0012	COIL	
L52	G1C100KA0046	COIL	
		(THERMISTOR)	
IP2	D4FBR2000002	THERMISTOR	
		(BATTERY)	
BAT1	BR12251VC	LITHUM BATTERY	


21. FOR THE SCHEMATIC DIAGRAM

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



Important safety notice

Components identified by  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

22. SCHEMATIC DIAGRAM

22.1. WAVEFORM

23. CIRCUIT BOARD

23.1. MAIN BOARD (COMPONENT VIEW)

23.2. MAIN BOARD (BOTTOM VIEW)

23.3. TILT BOARD (COMPONENT VIEW)

23.4. TILT BOARD (BOTTOM VIEW)

23.5. LENS BOARD (COMPONENT VIEW)

23.6. LENS BOARD (BOTTOM VIEW)

23.7. VIDEO BOARD (COMPONENT VIEW)

23.8. VIDEO BOARD (BOTTOM VIEW)

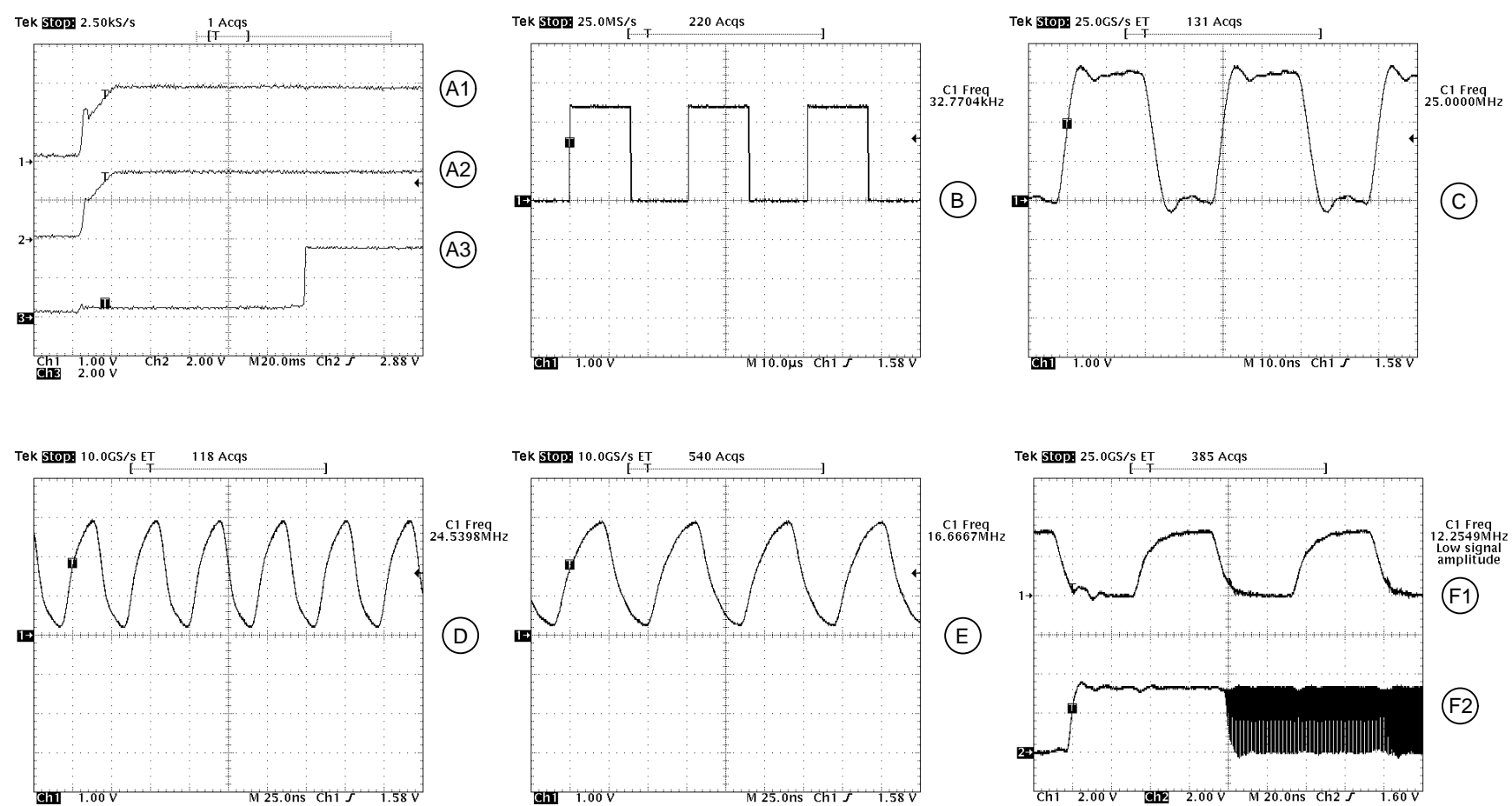
23.9. CCD BLOCK (COMPONENT VIEW)

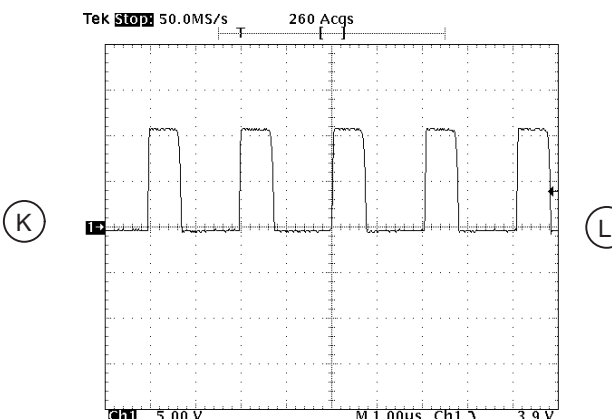
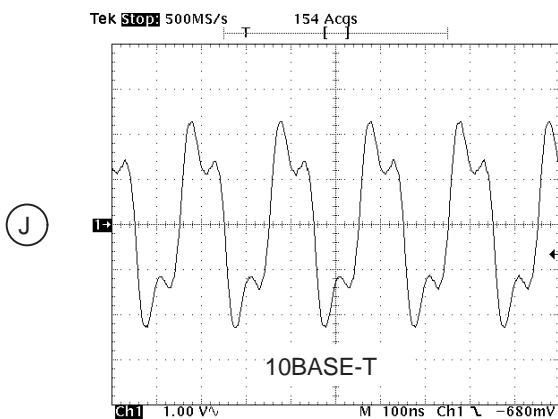
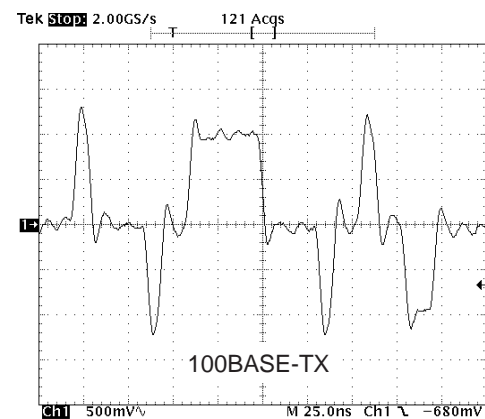
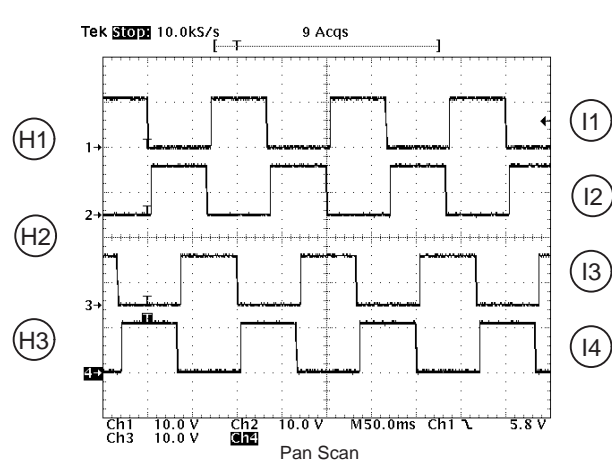
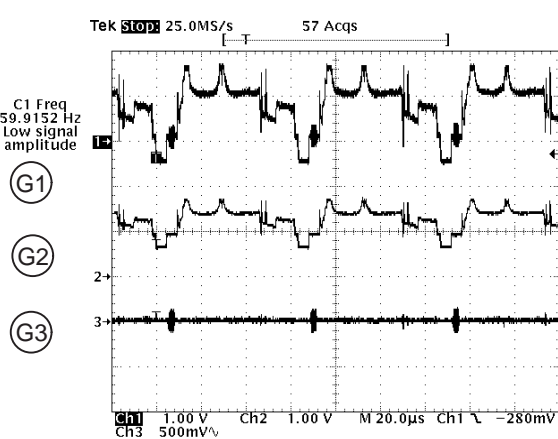
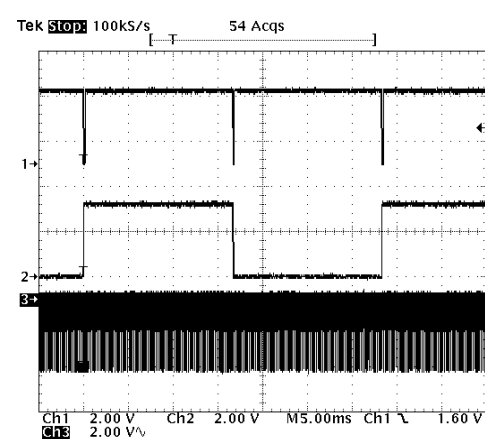
23.10. CCD BLOCK (BOTTOM VIEW)

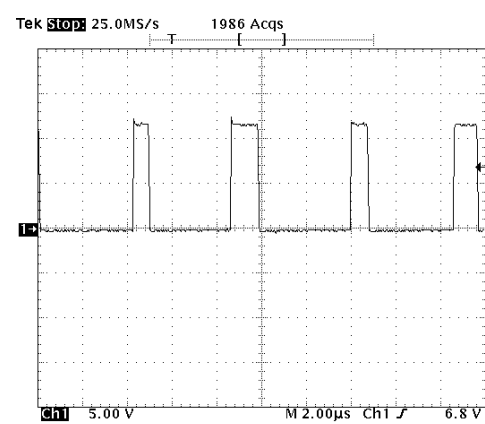
23.11. I/O BOARD (COMPONENT VIEW)

23.12. I/O BOARD (BOTTOM VIEW)

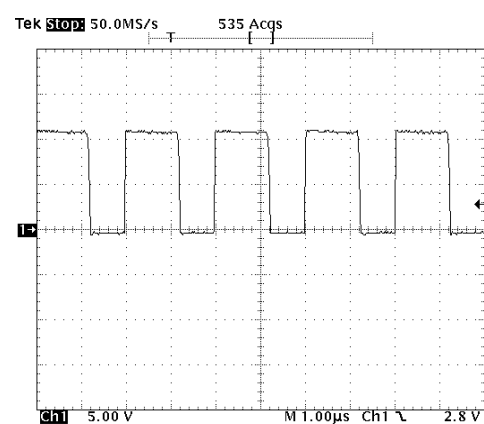
A KXHCM280



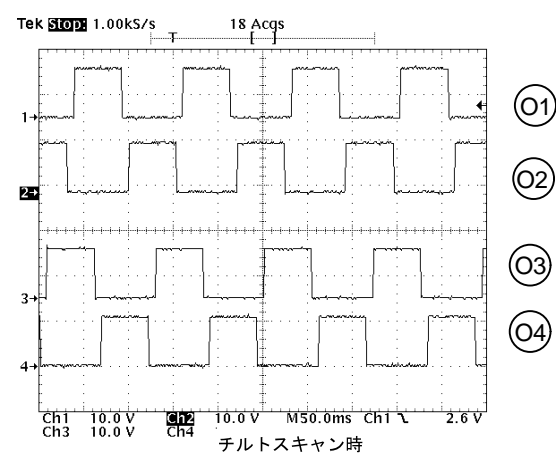




(M)



(N)

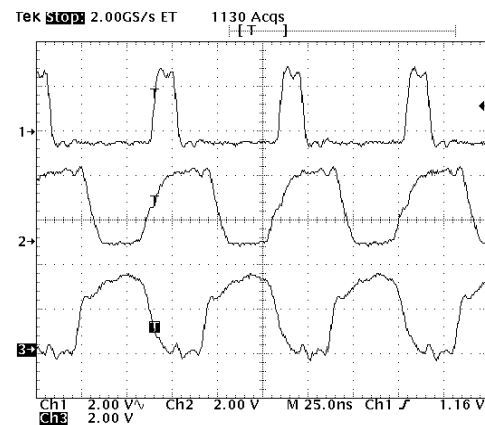


(O1)

(O2)

(O3)

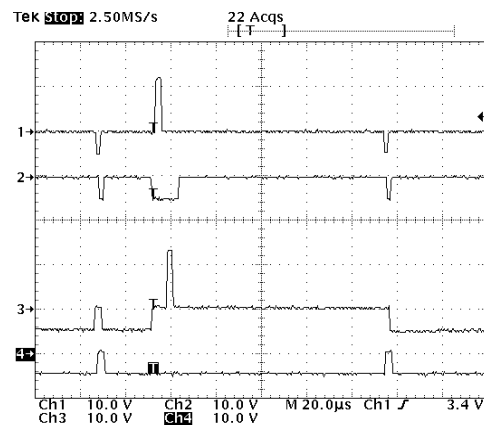
(O4)



(P1)

(P2)

(P3)

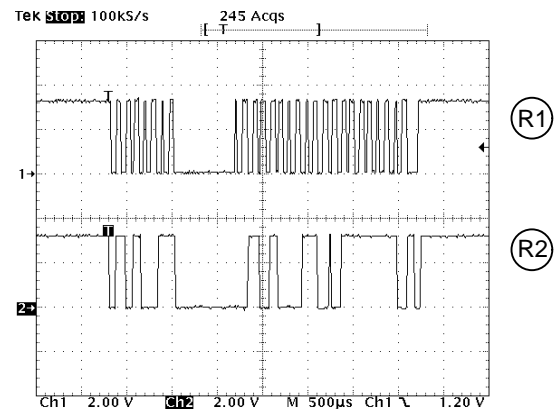


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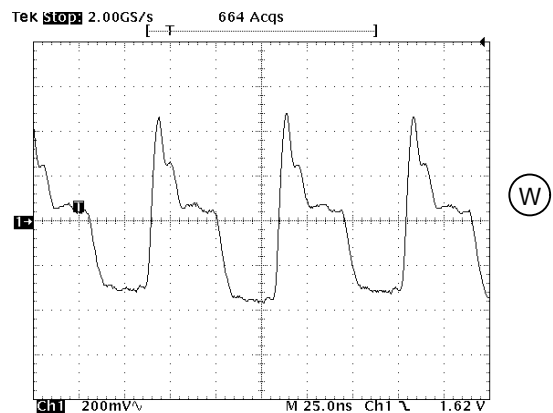
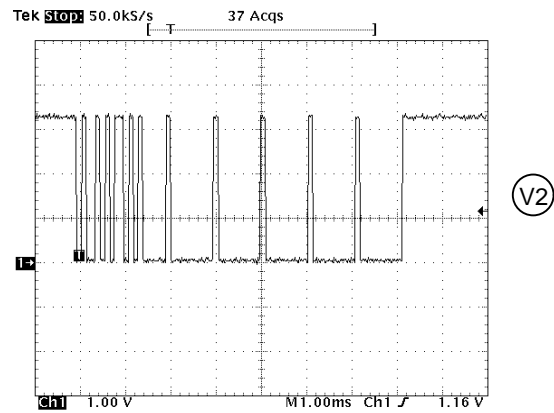
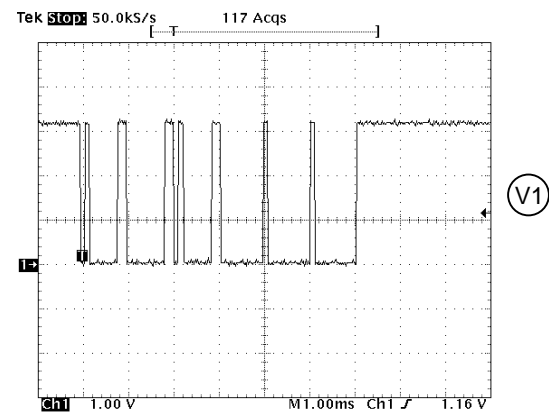
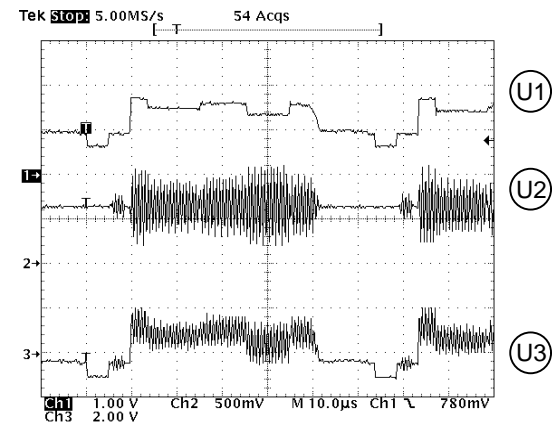
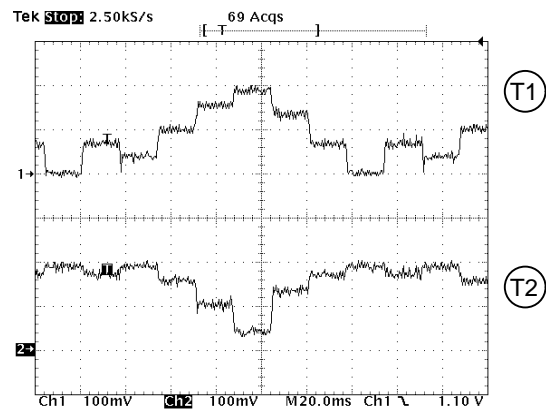
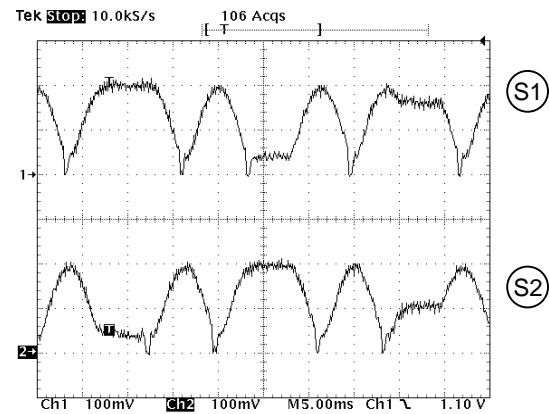
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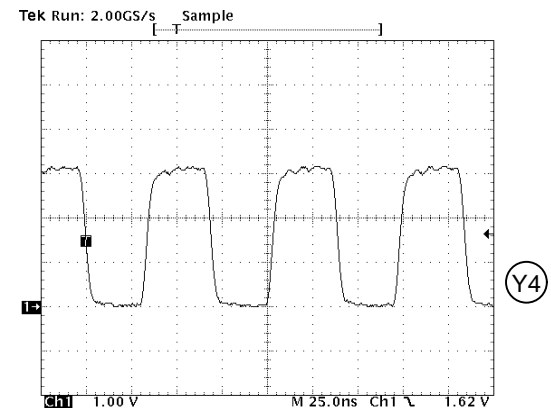
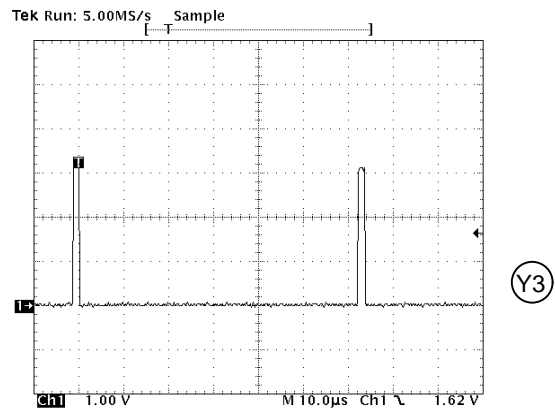
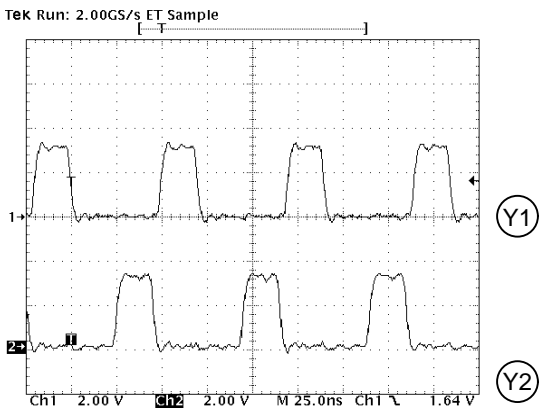
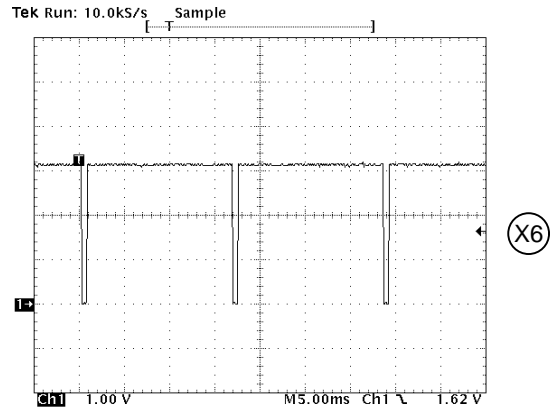
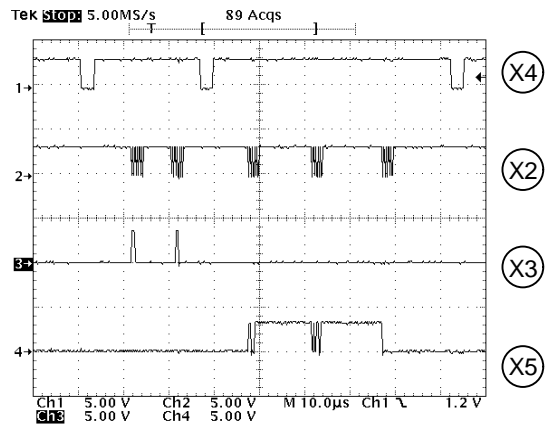
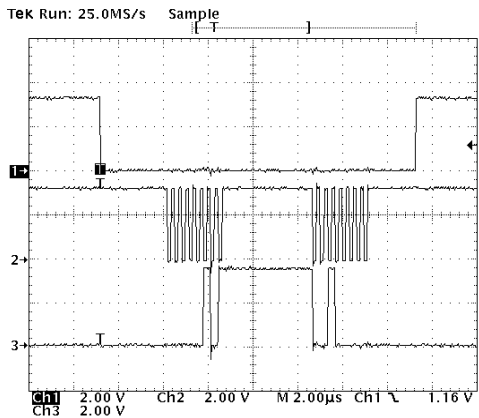
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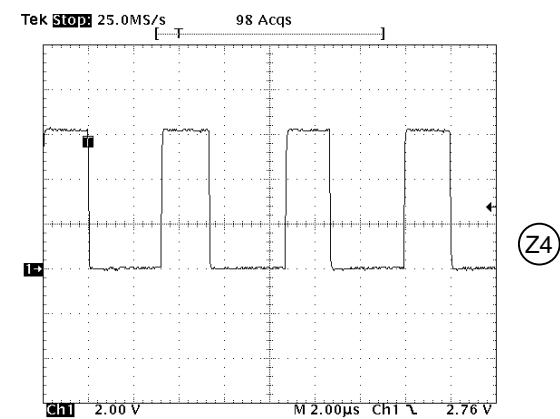
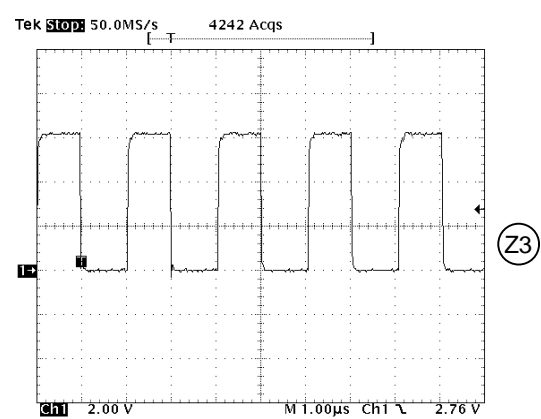
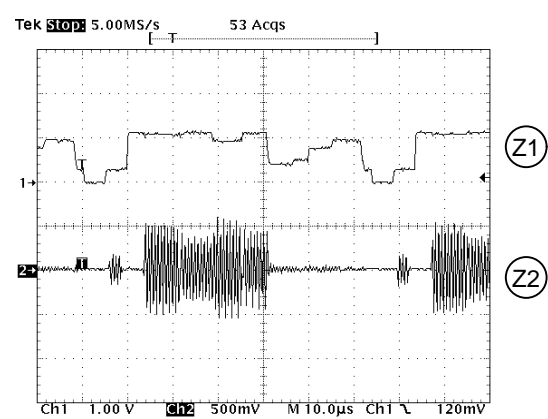


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(R2)





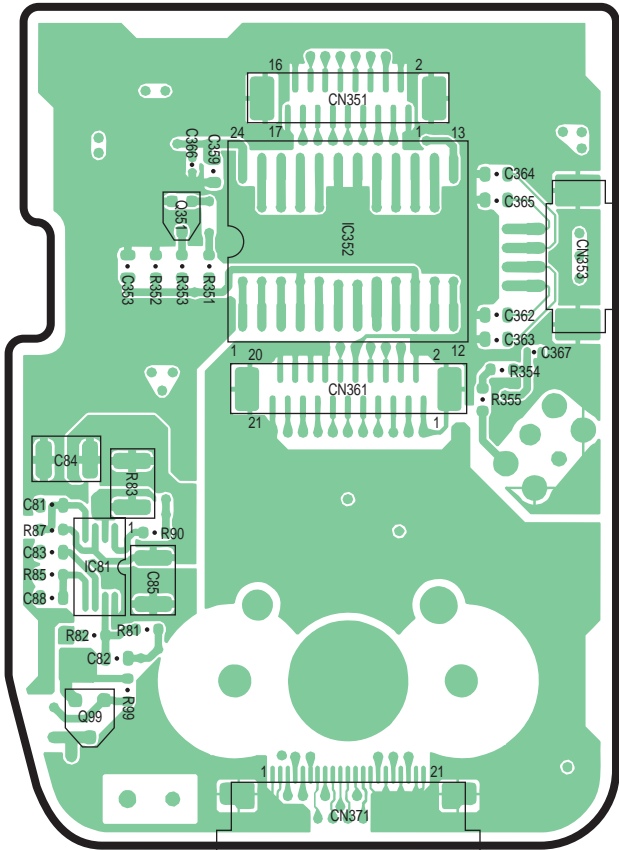




KX-HCM280 MAIN BOARD COMPONENT VIEW

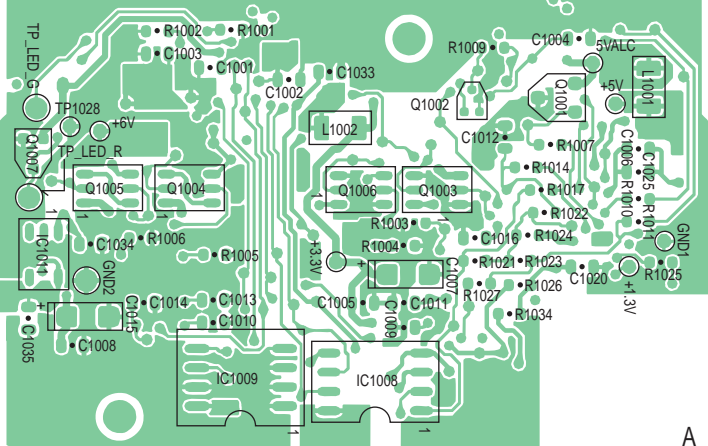


KX-HCM280 MAIN BOARD BOTTOM VIEW



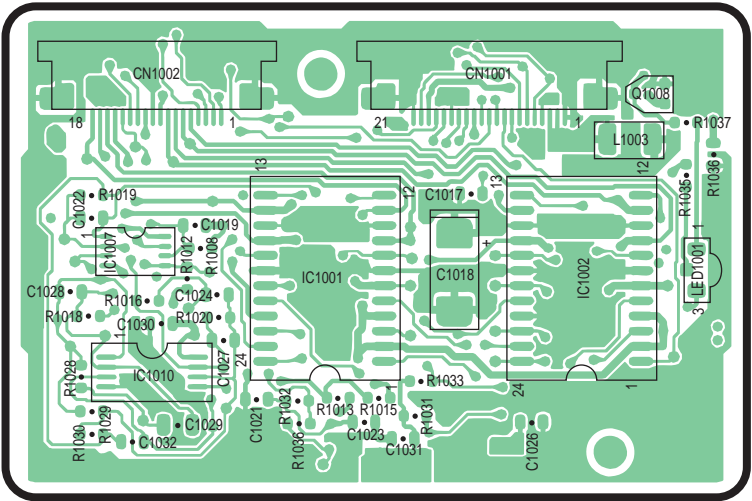
KX-HCM280 TILT BOARD BOTTOM VIEW

PSUP1418Z

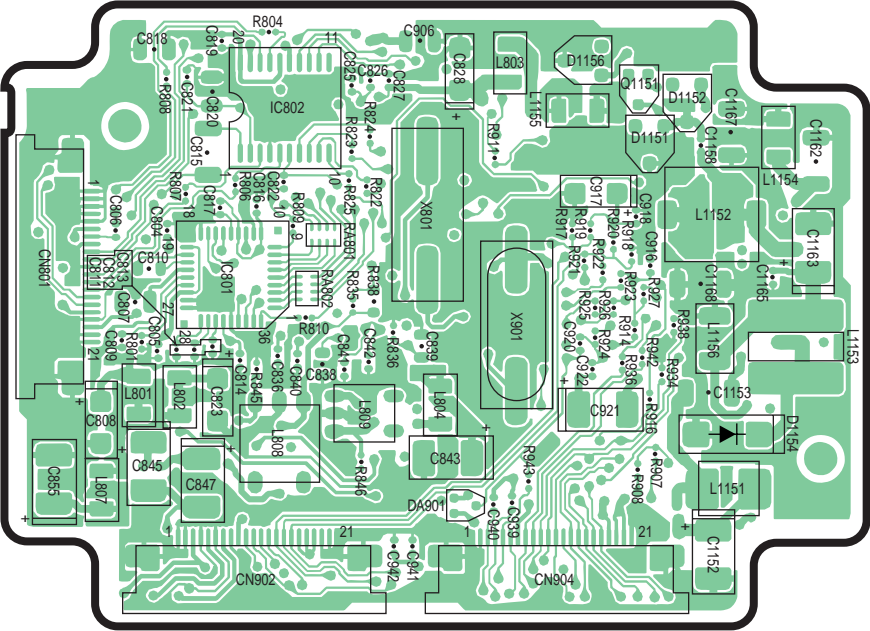


A

KX-HCM280 LENS BOARD COMPONENT VIEW

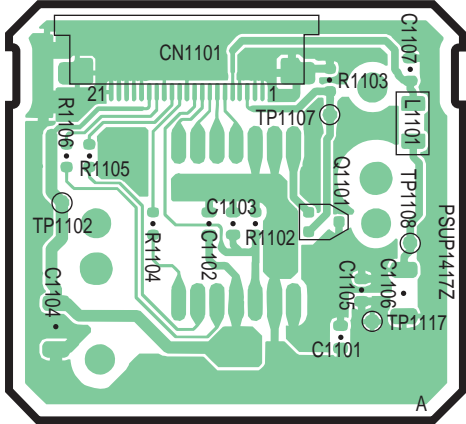


KX-HCM280 LENS BOARD BOTTOM VIEW

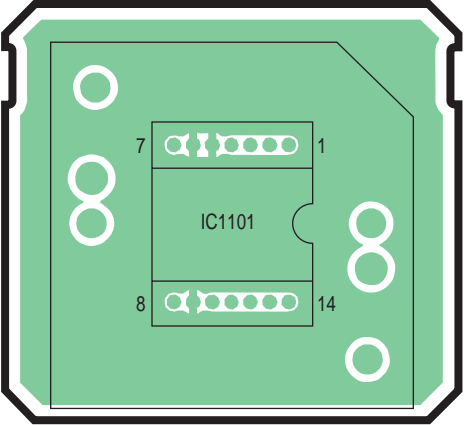


KX-HCM280 VIDEO BOARD COMPONENT VIEW



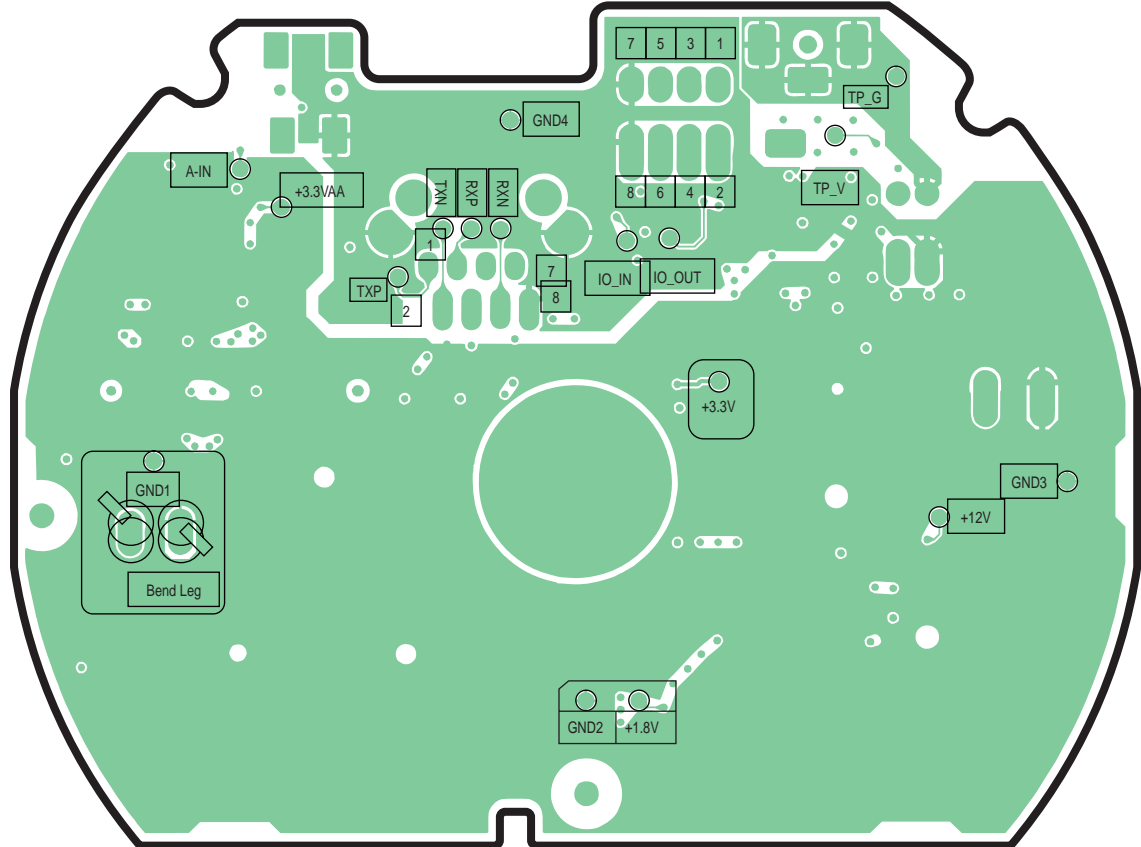


KX-HCM280 CCD BOARD COMPONENT VIEW

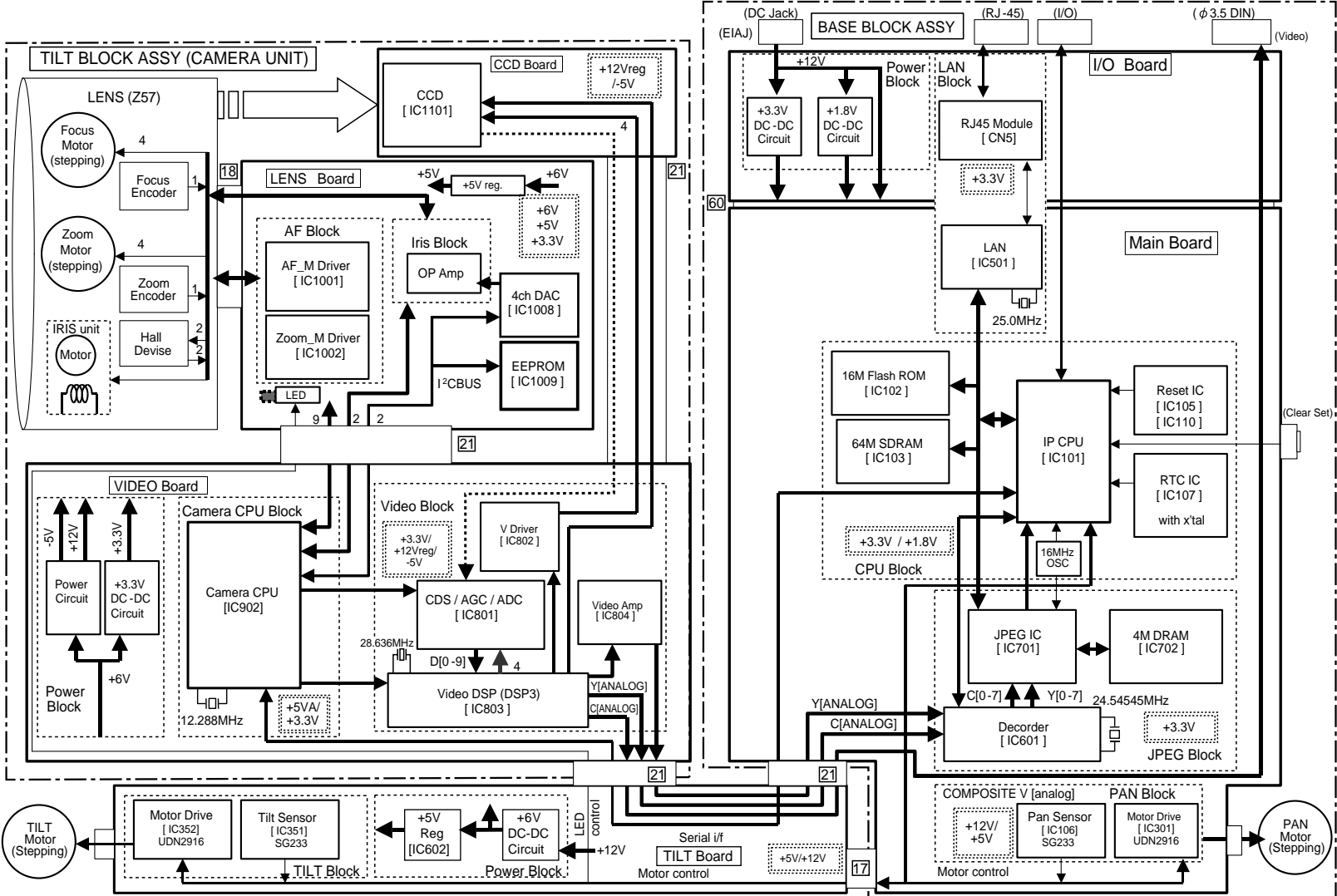


KX-HCM280 CCD BOARD BOTTOM VIEW



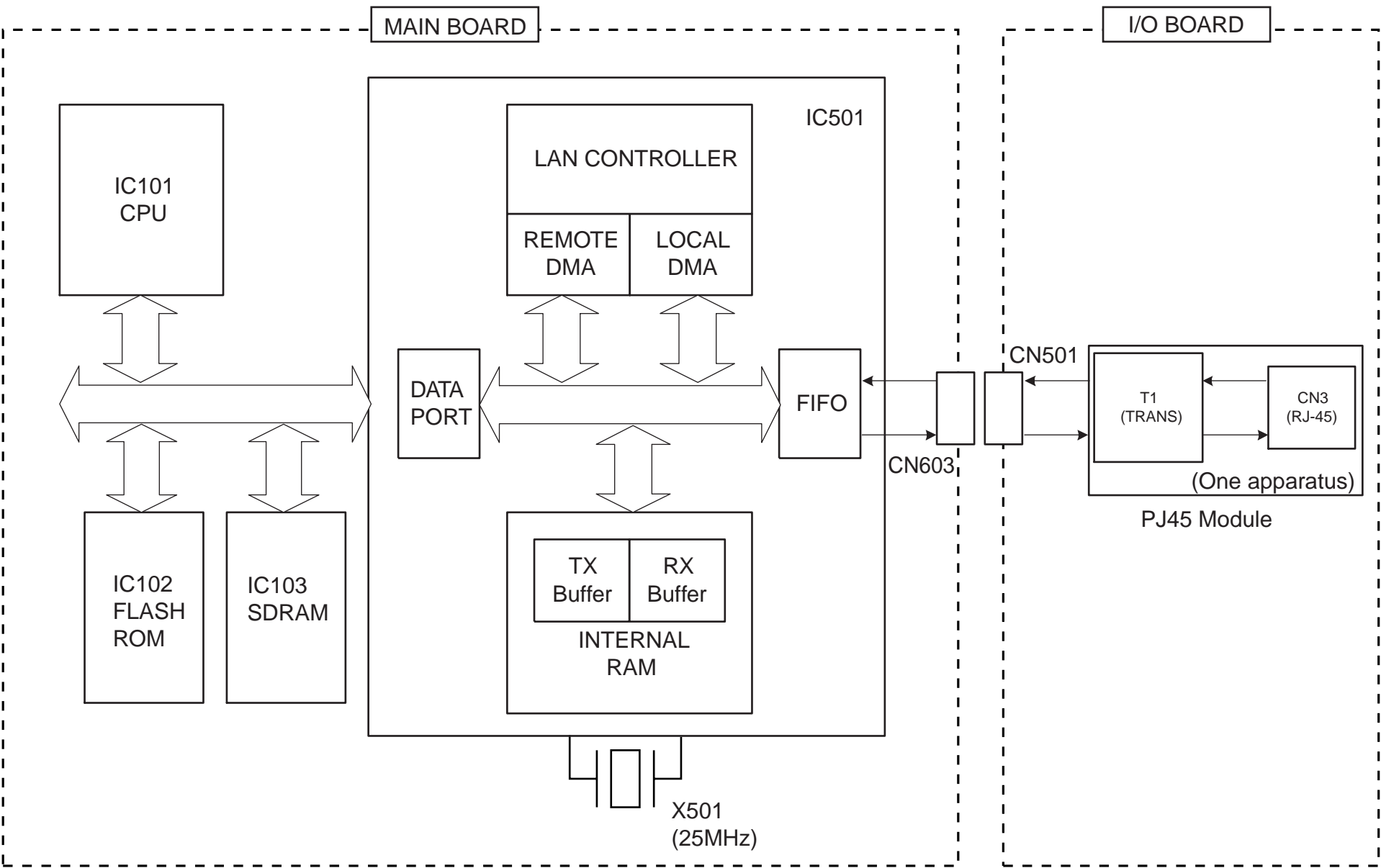


KX-HCM280 I/O BOARD BOTTOM VIEW

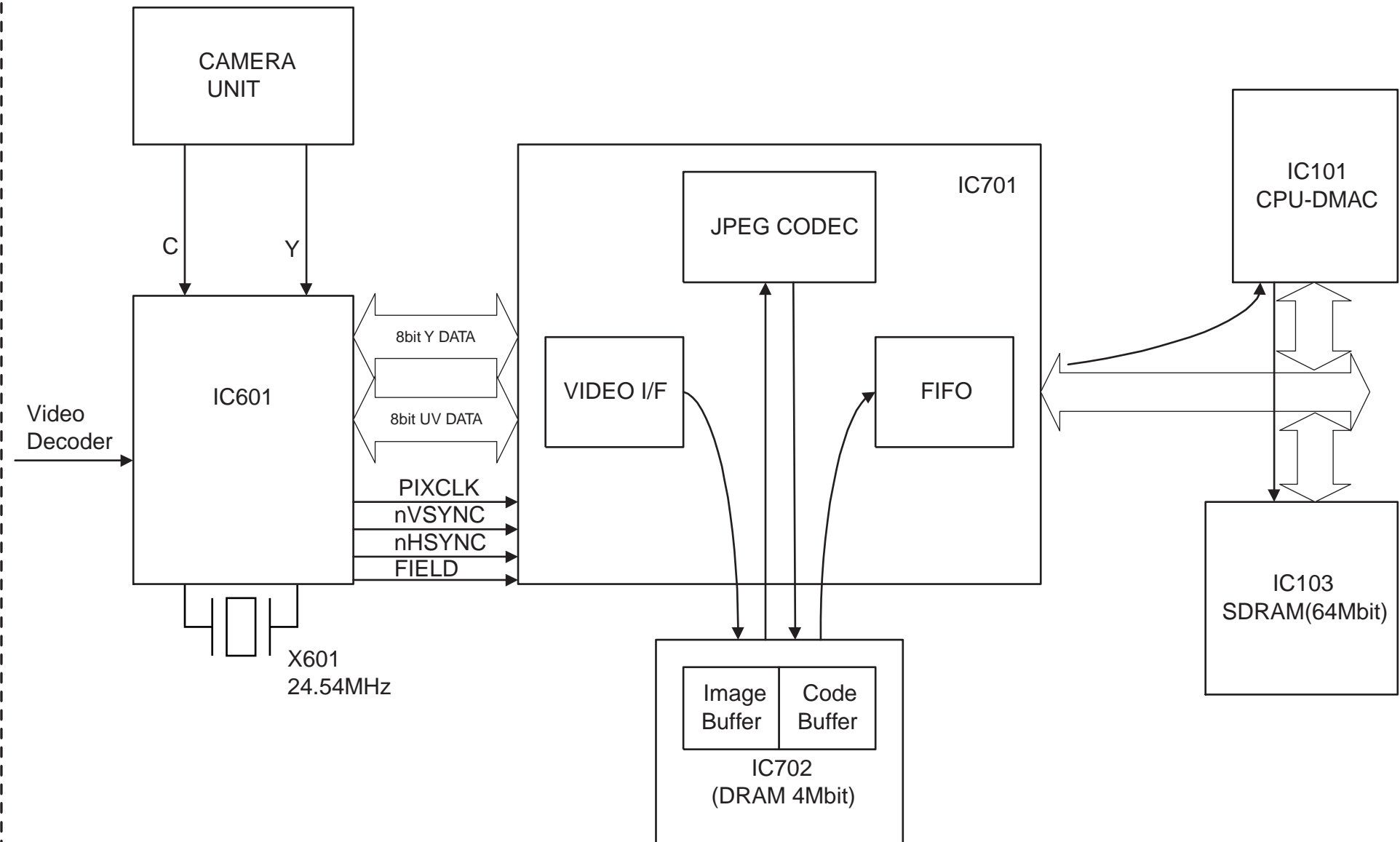


KX-HCM280 BLOCK DIAGRAM

LAN BLOCK DIAGRAM

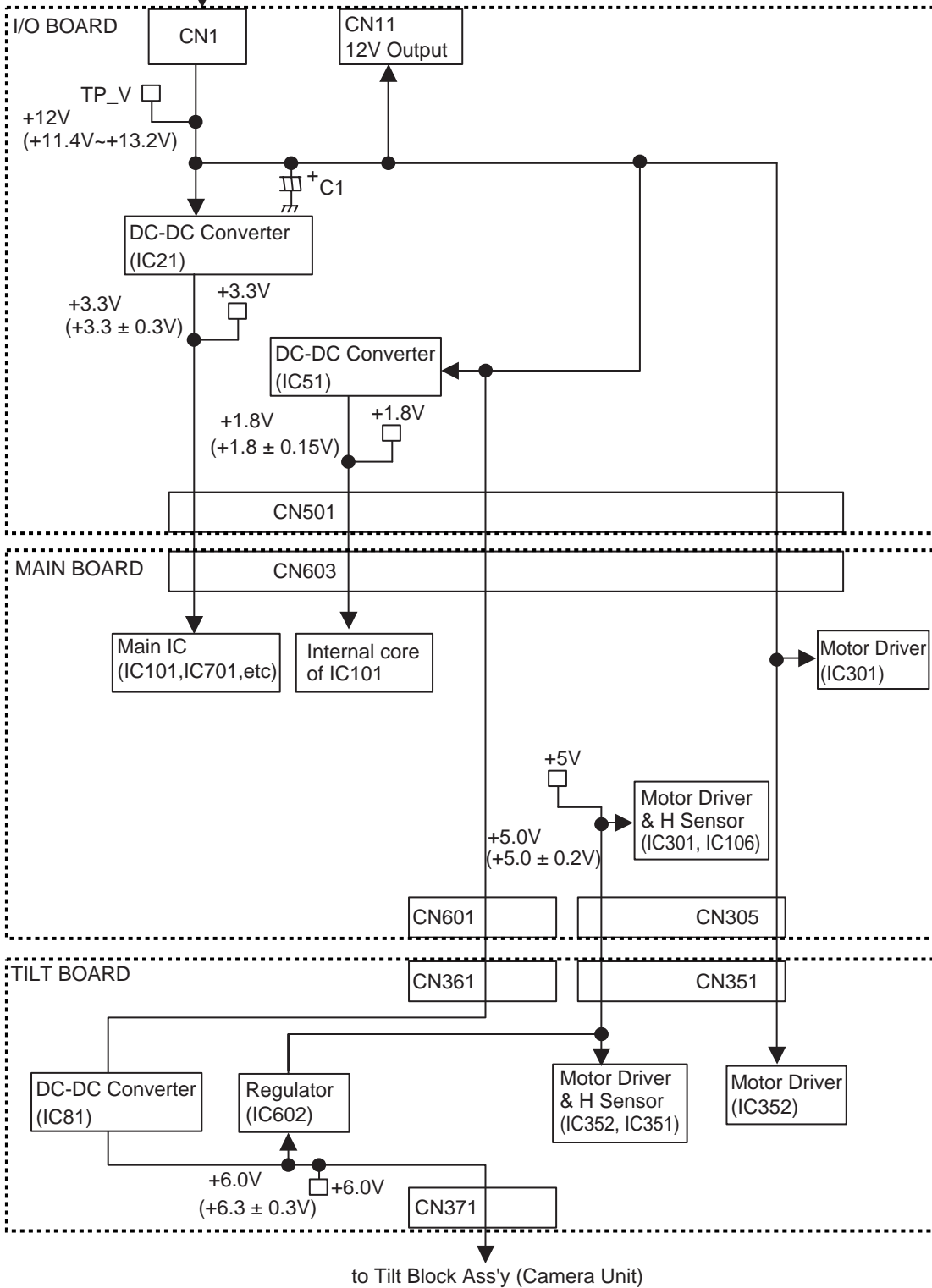


JPEG BLOCK DIAGRAM



AC Adaptor

+12V



TILT BOARD
(CN371)

VIDEO BOARD

CN902

+6V

DC-DC Converter
(IC1153)

+3.3V
($+3.3 \pm 0.3V$)

+3.3V

DC-DC Converter
(IC1152)

+12.0V
($+12.0 \pm 0.36V$)

+12.0V

Pump up Reg.
(D1156,Q1151,etc.)

-5.0V
($-5.0 \pm 0.5V$)

-5.0V

Main IC
(IC803,IC902,etc.)

CPU
(IC902)

V-Driver
(IC802)

CN904

CN801

LENS BOARD

CN1001

Stepping Motor
(IC1001, etc.)

Regulator
(IC1011)

+5.0V
($+5.0 \pm 0.2V$)

OP Amp & LED
(IC1007,LED1001)

CCD BOARD

CN1101

CCD
(IC1101)

